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NEWSPAPER

Warning: FM No Bargain For Users

By **Howard Karten**
CW Staff

NEW YORK — "It makes no more sense to get rid of your DP operation than it does to get rid of your manufacturing operation or your personnel or legal department — those are not things you farm out," Dick Brandon, president of the Brandon Consulting Group, Inc., said here recently.

Cautioning that his remarks applied primarily to the private, commercial sector — "the government sector is peculiar, perhaps because government finds it easier to get and to manage dollars than people" — Brandon noted there are a lot of situations and companies in which the customer is simply not getting the service level it thought it was going to get.

The fundamental reason for this, Brandon explained, arises from the differing business viewpoints of the manager and the managed. A facilities management (FM) firm is interested in maximizing its profit, which often means supplying the minimum or threshold service provided for in its contract. In contrast, an internal DP department is usually more interested in being of service to the company, since the department's interests are more closely aligned with those of the parent organization.

Citing the parable of the blind men and the elephant, the consulting company president said, "You've got two different companies with totally different objectives looking at a common problem, and they can't see it the same way."

An example of these differing perceptions of a company's problems can be found in looking at a company's plans for an inventory system, Brandon said. A facilities manager will say, "OK,.what you want to do is produce inventory reports and monthly distribution reports

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COMPUTERWORLD
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IBM Revamps — For E Series?

ARMONK, N.Y. — In a move that some observers see as a hint that IBM will soon announce its E series systems, the company last week announced the reorganization of the System Products operation of the DP Division into two units, Data Systems and System Products.

The Data Systems Division will have development and manufacturing responsibility for "large, complex systems with primary emphasis on high-performance products." An IBM spokesman confirmed this will include the Series 30.

Data Systems will encompass the company's facilities at Poughkeepsie, East Fishkill, Brooklyn and Kingston, N.Y.

The System Products Division will have development and manufacturing responsibility for "intermediate performance range products," which will include the 370/138 and 370/148, the spokesman said. The company's facilities at Endicott, N.Y., Boeblingen, Germany, and Es-

(Continued on Page 6)

Contu's Final Report: Copyright for Software

By **Edith Holmes**
CW Washington Bureau

WASHINGTON, D.C. — Congress should extend copyright protection to computer programs and data bases, a national commission concluded in its final report to the legislature and President Carter on the last day of last month.

In reaching this conclusion after three years of study and debate, the National Commission on New Technological Uses of Copyrighted Works (Contu) was influenced by the growing use of computers and particularly by their advent in the home, according to a Contu staff member.

Other protections, such as trade secrets, have worked well in the past and will continue to serve commercially valuable computer software, Michael S. Keplinger, assistant executive director and senior attorney for Contu, said at a recent breakfast meeting organized by the Washington office of the Data Processing Management Association. "But as programs are mass-produced and sold across the counter, the protections offered by the copyright law become more important," he added.

While Contu considered several hybrid forms of protection — generally something between a copyright and a

(Continued on Page 4)

Post Office Moving Ahead on Ecom

By **Ronald A. Frank**
CW Staff

WASHINGTON, D.C. — The U.S. Postal Service is moving ahead with its plan to test the advanced electronic message service — called Electronic Computer-Originated Mail (Ecom) — announced to vendors about two months ago, according to Postmaster General William F. Bolger.

Testifying recently before the Senate Subcommittee on Communications, Bolger said the Ecom service would be a cooperative effort between the Postal Service and the private sector and would be designed to meet a two-day delivery schedule "throughout the 50 United States, except for certain very remote and unpopulated points."

To take advantage of the projected service, a user with a large volume of mail would generate the text of messages and address lists on its own in-house DP equipment. This information would then be transmitted to a private firm under contract with the Postal Service for transmission over the contractor's network to designated post offices.

There the messages would be printed out, put in envelopes and delivered by the Postal Service with regular first class mail, Bolger explained.

Ecom service could be provided at fees ranging from 30 cents to 55 cents for a one-page message depending on the monthly volume of the user, he added.

The Postal Service has received a proposal from Western Union for a test and evaluation of Ecom, and this proposal is now being studied, Bolger told the subcommittee.

The Postal Service is also in the early stages of a long-term program to explore the potential for a domestic

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IN DEPTH
IN DEPTH
IN DEPTH

How can we impose limits on our native language so analysts, designers, programmers and users can safely use it to define what they are trying to develop? See Part II of "Breaking the Language Barrier," starting on Page 30.

Ex-Controller Admits Guilt In $140,000 Fedwire Theft

By **Brad Schultz**
CW Staff

SAN DIEGO — Robert Grant Jones has pleaded guilty in federal court here to charges that he impersonated Bausch & Lomb Co.'s corporate treasurer in an unsuccessful attempt to gain $140,000 through the computerized Federal Reserve Wire (Fedwire).

Identified as a former controller of a company Bausch & Lomb recently acquired, Jones is slated for sentencing later this month on two counts of wire fraud and one count of conspiracy to commit wire fraud.

Jones reportedly telephoned the Lincoln National Bank in Rochester, N.Y., identified himself as Bausch & Lomb Treasurer W. Henry Aughey III and requested that $140,000 be transferred through Fedwire to the account of a third party at the Security Pacific National Bank in El Cajon, Calif., near San Diego.

Relying on his financial experience, Jones initiated the transfer by using the Rochester-based manufacturer's Federal Reserve Communications System "key code" to substantiate the requisition of its service bank, according to Assistant U.S. Attorney Howard

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In Legal Bout With Niosh

GM Not Giving Up Medical Files

By Edith Holmes
CW Washington Bureau

DAYTON, Ohio — A nine-month legal battle has been going on here between General Motors Corp. and a federal occupational health agency over whether GM should be required to turn over its employees' medical records to federal investigators without the employees' consent.

GM has refused to give the records to the National Institute for Occupational Safety and Health (Niosh), citing employees' right to privacy. Niosh should contact the individuals directly if they wish to obtain the files, GM contends.

Niosh, on the other hand, argues that contacting individuals would be a waste of time. In addition, "The price of an industrial society is that you have to give up some rights. What happens to you might affect future generations," a Niosh attorney told Judge Carl B. Rubin, who will rule on the issue.

If Judge Rubin rules in Niosh's favor, GM could be forced to turn over medical information on 704 employees at the local Inland Division plant, including information on employees who don't want their files released.

While the plant's records are contained in manual files, Niosh plans to computerize the information the records contain. That data will be used in Niosh's investigation of complaints that employees at the wet latex operation have been experiencing health problems — chiefly skin disease, a spokesman for the court said.

Once in Niosh's hands, the information could be transferred legally to any other unit within the Department of Health, Education and Welfare (HEW) since under the Privacy Act of 1974, HEW is defined as an agency even though it has as many as 11 units under its organizational umbrella.

GM Position

In documents filed in the case, GM argued that "employee medical records contain information that is personal and sensitive in nature. Such information is disclosed by employees and their physicians with the expectation that it will be held in confidence."

The corporation further contended that "the employee medical records at issue here are protected by a constitutional privacy right."

Attorneys for the automobile company fear that if the government can obtain medical records at Inland without employee consent, it will be able to acquire such personal medical information at other GM plants where similar Niosh investigations are being conducted.

The lawyers also anticipate that if Niosh acquires these records, GM will be open to lawsuits by employees who feel they were harmed by the release of their medical files and potentially sensitive personal information.

Niosh officials contended during the trial, however, that if their right to subpoena employee medical records is impaired, their agency will be totally ineffective as a watchdog over occupational safety.

No Right to Privacy

Representing the occupational health agency, attorneys with HEW maintained there is no general right to privacy and that federal statutes give the government absolute authority to obtain employee medical records through legal means with or without employee approval.

Niosh, which conducts about 100 investigations each year, said it would be faced with debilitating delays if it were required to seek the permission of every employee for the release of medical files.

The federal agency also rejected GM's offer, made during the trial, to make the medical records available with the names of the employees deleted. The names of employees are crucial to follow-up questioning and investigations in a health hazard study, Niosh stated.

During the course of the nonjury trial, Judge Rubin asked HEW attorney Howard Walderman if he drew any distinction between the records of employees who are willing to cooperate with the government and those who would not cooperate.

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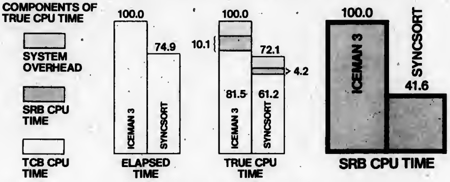
Here's a recent example: A certain large MVS user — in pursuit of the very best OS sort available — sponsored a "showdown" benchmark between SyncSort and IBM's 5740-SM1, Release 3. Let the best sort win!

Apparently IBM took the test seriously, because they flew in one of their top "sorting aces" to critique the results. A hardware monitor would be used to pick the winner. It was said to be of "awesome accuracy."

As the two sorts took off and the benchmark began, this eagle-eyed device began to shoot some gaping holes in ICEMAN 3's performance — or lack of it.

ICEMAN not only used a lot more computer resources than SyncSort — it also suffered from a near terminal case of "locked up" SRB Time. This is, of course, that portion of True CPU Time when no messages get through to the CPU. Very dangerous to non-sorting jobs in the mix! Like going down through an overcast with no radio or instruments.

The final results of our duel in the sun looked like this:



How did IBM's ace react to being shot down? Like a gentleman and a scientist. With a stiff upper lip, he admitted: (1) that SyncSort was a good deal better than ICEMAN; and (2) that there wasn't much he could do about *that*.

Then he packed his bags and flew off westward into the sunset.

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Hersey Says Contu Decision Endangers Quality of Life

WASHINGTON, D.C. — Not all members of the National Commission on New Technological Uses of Copyrighted Works (Contu) were happy with the commission's final recommendation that copyright protection be extended to computer programs and data bases.

Author John Hersey voiced that unhappiness in Contu's final report and at the commission's last meeting. While he agreed that computers have reduced "the load of human labor," he said "a definite danger to the quality of life must come with a blurring and merging of human and mechanical communications."

If Congress adopts Contu's recommendations on software, it will be the first time copyright protection has been extended to a "communication" with a machine, the author said in the final report.

"A society that accepts in any degree such equivalences of human beings and machines must become impoverished in the long run in those aspects of the human spirit which can never be fully quantified and which machines may be able in some distant future to linguistically 'understand' but will never be able to experience, never be able to bring to life, never be able therefore to communicate: courage, love, integrity, trust, the touch of flesh, the fire of intuition, the yearning and aspirations of what poets so vaguely but so persistently call the soul — that bundle of qualities we think of as being embraced by the word 'humanity,' " Hersey wrote.

At the final meeting of the commissioners, Hersey stated he felt some sadness in the reflection that Contu "spent three years to tell Congress that it should make aiding and abetting technology's dominance of human endeavors that much more legal.

"It is a little crime, a petty crime," he said. "I think it will give us trouble in generations to come, but maybe no one will notice."

GM Not Giving Up Files

(Continued from Page 2)

Walderman answered no, citing the need to give up some rights in an industrial society in the interest of future generations.

Shades of 1984

Pressing Walderman on the question of employees' right to privacy, Rubin queried whether the attorney had ever read Orwell's *1984*. The government described in that book "is a logical extension of what you are saying. I do see that as one end-product," the judge stated.

Rubin acknowledged the wide-ranging questions about government access to private records — whether maintained manually or on a computer system — raised by the trial. "I realize this has significance beyond the case," he said.

Computer and communications industry members agreed with Rubin here last week. Robert S. Willard, director of the Data Processing Management Association's Washington office, predicted, for example, that the GM-Niosh case will go all the way to the U.S. Supreme Court.

Other industry representatives noted that the case comes at a time when Congress appears to be moving toward curtailing government access to financial records, despite the opposition of the Justice Department. The subjects of medical records in particular and government access to the files on its citizens in general will be the topics of congressional hearings during the course of the next year, they said.

The GM-Niosh privacy controversy was initiated by a complaint to the federal agency from a union health and safety representative in October 1976. Federal officials visited the Inland plant three months later, but GM failed to produce the files then or last October in response to a subpoena from Niosh.

Rubin hopes to issue his opinion on the case by the end of August, according to his law clerk.

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Photographed at a recent meeting were commissioners Robert Wedgeworth, executive director, American Library Association; Contu Chairman Stanley H. Fuld of Kaye, Scholer, Fierman, Hays and Handler; and author John Hersey.

Contu Goes for Copyrights

(Continued from Page 1)

patent — these solutions all turned out to be copyrighted under other names.

Copyright Opposition

At the close of Contu's deliberations, nine of the commission's 13 members wholeheartedly endorsed an amendment to the Copyright Act of 1976 that would place computer software under a copyright's protective umbrella as long as the programs "embody an author's original creation."

Commissioner John Hersey led the opposition to this recommendation, contending that "copyright is an inappropriate, as well as unnecessary, way of protecting the usable forms of computer programs.

"In the early stages of its development, the basic ideas and methods to be contained in a computer program are set down in written forms, and these will presumably be copyrightable with no change in the 1976 act," Hersey stated. "But the program itself, in its mature and usable form, is a machine control element, a mechanical device, which on constitutional grounds and for reasons of social policy ought not to be copyrighted."

Interim Solution Offered

Contu vice-chairman Melville B. Nimmer concurred with the commission's final recommendation, but shared Hersey's doubts and concerns about open-ended copyright protection for all computer programs.

Nimmer suggested an interim solution that would allow copyright protection only for those programs that lead to the production of a work traditionally covered by the law. Under his scheme, software that produces graphics could be copyrighted, for example, but computer programs that control a fire sprinkler system could not be covered.

Without agreeing with all Hersey said in his dissent, commissioner Rhoda H. Karpatkin added her voice to the opposition. She also noted that the late commissioner William S. Dix, who died before the final Contu report was completed, had reservations about copyrighting software.

Concern for Authors

In addition to recommending that copyright law apply to all computer uses of copyrighted programs, Contu asked Congress to assure that the rightful owners of the software can use or adapt copies of the programs.

All the commissioners agreed, however, that the 1976 Copyright Act should be amended to cover all computer uses of copyrighted data bases and other copyrighted works "fixed in computer-sensible media."

They further concluded that works created by the use of computers — works ranging from music and art to stories — should be afforded copyright protection if they are "original works of authorship" as currently defined by the copyright law.

Contu suggested that any legislation resulting from its recommendations be reviewed periodically, taking into account technological change, the law's impact on competition and consumer prices in the computer and information industries and the legislation's effect on cultural values.

Keplinger explained that under the Contu recommendations, a computer program written as object code is automatically copyrighted, regardless of whether it is registered with the U.S. Copyright Office. An individual or firm can register the software's source code or its object code or both with the office under its current requirements for depositing the copyrighted work.

The commission has suggested that the register of copyrights develop guidelines for deposit that are specially tailored to computer programs, he added.

Under the copyright doctrine of "fair use" and the notion of the widest possible dissemination of works protected by this law, copying a computer program from Cobol to Algol probably wouldn't constitute an infringement of its author's rights, Keplinger explained. But if a programmer can prove that someone with access to a copyrighted program produced another piece of software substantially similar to it, then he has a good case for a copyright infringement suit, the attorney said.

Contu was unable to consider copyright protection for the topography of microcircuit chips, Keplinger stated. The issue of copyrighting the masks used to produce the chips wasn't raised until too late in the commission's life, he explained, adding Contu had received reports that the masks are "ripped off" regularly.

At the commission's final meeting in mid-July, Nimmer expressed his satisfaction that Contu did not reach unanimity. "It is better that we reflect the real world — that we make the public aware of our doubts," he said.

Some Say System Too Slow

Pentagon Split on Effectiveness of Crisis Aid

By Brad Schultz
CW Staff

WASHINGTON, D.C. — A worldwide network of computer systems developed by the Pentagon to supply armed services commanders with information quickly in times of crisis does not work, according to news reports.

But others within the Department of Defense (DOD) have said its Worldwide Military Command and Control System (WWMCCS), based on a Honeywell Information Systems, Inc. 6000 series mainframes, serves its purpose. Both DOD and HIS did concede, however, that "there are more advanced computers" than the Model 6000s, which were designed in the late 1960s and obtained in 1972.

The arguments against WWMCCS (familiarly pronounced "Wimex") appeared in a Long Island *Newsday* news service article that claimed DOD had spent almost $1 billion over a six-year period to develop the network and that the network's typical query response time is too slow to be an effective aid in fast-breaking military emergencies.

Effectiveness Defended

The WWMCCS mainframes "were procured to support worldwide headquarters in a wide range of situations from day-to-day planning and force monitoring thrugh the conduct and termination of nuclear war," according to U.S. Air Force Col. Perry R. Nuhn, acting director for information systems in the Office of the Secretary of Defense.

"In this regard, the WWMCCS computers are effective systems that perform important command and control tasks. In . . . situations short of war, where we must respond quickly to unforeseen events .... they provide valuable information and assist with planning," Nuhn said.

"But the computers do not provide the kind of quick, concise answers to the entire range of possible questions a commander may ask as a part of the decision process," he continued. "For that, the commander relies on other elements of the command and control system — his staff and his communications.

"Designing a computer system to quickly answer all possible questions that might be asked by a commander . . . is not achievable at affordable cost with today's technology," he added.

Nuhn said U.S. commanders have relied on WWMCCS to handle such emergencies as the 1975 Cambodian seizure of the U.S. merchant ship Mayaguez, which resulted in an immediate alert of U.S. warships and planes in the western Pacific and the helicopter rescue of the Mayaguez crew by 200 Marines just three days after the crew's capture.

The key problem in obtaining "quick answers" in such a crisis is not the length of response times, but whether adequate data has been stored in WWMCCS prior to the incident, Nuhn indicated.

"Items such as the current fuel stocks at all airfields worldwide . . . would overtax our intelligence-gathering capabilities and are thus not maintained in current files," he explained. The problem is "how much information you can afford to collect and how often. It is more efficient in some cases to get the data as we need it."

In late 1967, the Pentagon announced a plan to upgrade WWMCCS that called for 109 new computer sites around the globe. The number of computer systems to be installed at these sites was put as high as 100.

However, the plan went through many false starts and revisions before actual implementation began in 1972. For example, in November 1969 the plan called for 34 to 53 medium- or large-scale mainframes at an estimated cost of $1 million to $5 million per system. The present network is comprised of 35 HIS 6000s, each supported by the mainframer's Gcos software, at 26 worldwide command posts, another spokesman at the Office of the Secretary of Defense said.

In late 1970, the government issued WWMCCS upgrade requests for proposals to 17 computer vendors despite charge by the Computer Peripherals Manufacturers Association (CPMA) that the General Services Administration — the federal procurement agency — was biased in favor of IBM. The CPMA was upset about the WWMCCS procurement, according to what Richard Caveney — then president of the now-defunct organization — said at that time.

The procurement's progress had been leading steadily toward an award to IBM, Caveney contended, noting that only IBM was given the government's interim study of the program and that the IBM 360 was established as the program's "second standard" CPU.

But HIS, not IBM, was awarded the contract in 1971. The Model 6000s are connected to remote terminals that reportedly cost an initial $160 million and have cost $100 million to operate each year since the 1972 installation.

The network is kept operational around-the-clock every day of the year. It relies on satellite communications technology, allowing batch and some transaction processing but not real-time processing.

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No Action on EFT Bills

BOSTON — Electronic funds transfer (EFT) legislation in the State of Massachusetts has been delayed another year because legislative, banking and consumer proponents could not agree on one bill that would contain both the authority to offer new services through EFT. and also ensure protection for users of the systems.

As last April's petition deadline approached, six or seven ideas were contained in 12 bills, and bankers and consumer groups "on the outside" were working on yet another version of ''what an electronic banking law should look like," according to Joe Leonard, research aide to the Legislature's Banks and Banking Committee, whose files on the subject go back three years.

Massachusetts has a Right of Free Petition which allows any citizen to file a bill by getting a senator or representative to put his name on it and file it. "That's why we end up with so many," Leonard explained. By the time the legislative session closed in mid-July, however, no agreements had been reached.

"We had felt in no way confident to offer any proposal because it's such a complex issue and no one bill was complete," Leonard said.

Leonard expects to see duplicates of this year's bills as well as new versions at next year's legislative session.

"It really is a tremendously complex issue; the committee gave it time this year and will give it more time next year," Leonard said.

"The committee is not under extreme pressure just to do something," he noted, adding "it is going to make sure it knows exactly all the ramifications of any bill or as many as possible."

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Controller Caught Stealing $140,000 Through Fedwire

(Continued from Page 1)

Allen. Allen is directing the federal prosecution in the case.

Nabbed in Mid-Stream

Jones' scheme was detected in mid-execution, a spokesman at the Federal Reserve Bank of New York said. Upon receiving Lincoln National's notice of the impending transaction, Security Pacific detected certain information in the notice that seemed odd. It contacted Bausch & Lomb, seeking to verify the transfer.

Bausch & Lomb denied making the request, so the West Coast bank contacted Fed-New York, which began an investigation. Only days later, Jones was arrested in California when he attempted to withdraw the money.

Lincoln National and Security Pacific have confirmed the incident, but declined to provide details of Jones' method of attack or their methods of security, explaining that such publicity would itself be a security breach.

Jones is facing five years' imprisonment and a $1,000 fine on each count of wire fraud, as well as five years and a $10,000 fine on the conspiracy count.

Jones has also been charged with grand theft involving computer abuse allegedly perpetrated between 1972 and 1975, but the Los Angeles District Attorney Office declined to give details about that charge at this time. Jones faces state prosecution in Los Angeles on the grand theft charge following his federal court sentencing in San Diego.

Within days of the discovery of the Jones scheme, Fed-New York President Paul A. Volcker called for assurance from the top executive of each Second Federal Reserve District member bank that "sufficient controls over the authenticity of requests by customers to transfer funds" were being maintained.

The memo that conveyed Volcker's call also presented a rough outline of the Jones matter without identifying Jones or the commercial banks his scheme involved.

The incident occurred only about a month before Fed-New York management announced a forthcoming "complete security program" to protect Federal Reserve System electronic funds transfers [CW, July 10].

In making that announcement, a Fed-New York representative declared Fedwire to be vulnerable to breaches throughout its 40,000-mile network, noting that both inter- and intradistrict transfers of an illegitimate nature are possible since each of the 12 Reserve district banks' communications switches is linked with member commercial banks.

Security Measures

The Federal Reserve System has worked toward tightening Fedwire security since the Jones incident transpired in May, according to Fed-New York Assistant Vice-President Richard H. Hoenig.

However, many of these security enhancement procedures were incorporated or planned long before the assault, he noted.

"We have systems committees that have been talking about these safeguards . . . for a long time; and we have now implemented a notification procedure in the event of any fraud attempt," Hoenig said.

"This procedure calls for the communications officials at every Reserve [Bank] office to notify others within the [Federal Reserve] System of any intrusions or any fraud attempt . . . and, in fact, when this [Jones] thing happened, we did notify all around the system what had happened," he continued, noting the Volcker memo formed a small part of this procedure.

The systems committees are also developing a set of "communications control standards" which establish Federal Reserve System security guidelines, he added.

DES-Based Protection

Hoenig confirmed that "for about two years now" the Fed has been working with certain computer hardware vendors to develop a means of protecting Fedwire data flow that is based on the federal Data Encryption Standard (DES) algorithm.

DES devices are currently being tested for acceptance in Federal Reserve facilities for use on Fedwire, he said.

He declined, however, to name the vendors, the location of the testing and when the banks may decide whether to adopt them.

A Bausch & Lomb spokesman indicated the Jones' breach did not involve misuse of cryptographic methods of data protection, such as DES technology.

IBM Revamps — For E Series?

(Continued from Page 1)

sonnes, France, will fall within its purview.

However, since the 138 and 148 have been "demoted" by IBM to "limited new production" — which means the firm is only making some parts for these systems and no longer building them from scratch — observers believe this will free manufacturing capacity, particularly at Endicott, for the E series.

Two New Presidents

John E. Bertram, IBM vice-president of development and manufacturing for the former System Products Division, was appointed president of the Data Systems Division.

Jack D. Kuehler, who was an assistant group executive of the Data Processing Product Group, was named president of the System Products Division.

Both will report to Paul J. Rizzo, IBM senior vice-president and group executive of the Data Processing Product Group.

IBM also announced that Theodore C. Papes Jr., IBM vice-president and president of the former System Products Division, has been named IBM vice-president for business plans at corporate headquarters.

Papes succeeds Victor J. Goldberg, formerly IBM director of business plans, who will become IBM director of communications.

By Gathering ID Information

U.S. Death Index Would Aid Health Research

By Marguerite Zientara
CW Staff

WASHINGTON, D.C. — A computerized National Death Index (NDI) containing each decedent's name, maiden name or father's surname and Social Security Number (SSN) is being planned by the Department of Health, Education and Welfare's National Center for Health Statistics (NCHS) here.

The system would be used to aid medical researchers in "mainly epidemiological studies or medical and health studies," according to Dr. Drusilla Burnham of NCHS' Vital Statistics Records Department.

For example, if a researcher is following a group of workers who were exposed to a certain chemical, particularly if the project is over a long period of time, the researcher may lose contact with a particular person in the group, Burnham explained.

"The researcher will want to know if the person died and, if so, when he died and from what causes," she noted. "The index will tell him where the person died so the researcher can go to that state and get the actual death certificate."

From the death certificate, the researcher can make sure he has found the right person and can get other medical information as well, she said.

The new system would be entirely separate from NCHS' current computerized statistical information system in that it will collect only personal identifying information.

NCHS hopes eventually to centralize information from all the states about the two million deaths that occur every year, "but we can't say for sure how many states we'll have the first year," Burnham said. "It will depend on how fast we can get the contracting done."

Burnham said the system would include the SSN as an identification aid. "The SSN has always been on the death record," she said, adding, "We will not release information to anybody whose request has not been approved by a screening committee."

Most States Willing

"As far as I can tell, most states are very willing to participate," Burnham said, but added that some states may not be able to furnish the national system with information like SSNs "because some have their own privacy legislation."

Researchers who would take advantage of the system would be likely to work for private universities, the National Institutes of Health, the National Cancer Institute or the National Institute of Occupational Safety and Health — "a very varied community," as Burnham put it.

Today, if a researcher has a list of names he wants searched and he has no idea where the people died, he must go to 56 separate state registration areas and ask them to search their files for each one of the names sought.

"That's very expensive for the researcher and time-consuming for the states," Burnham explained. "By having a centralized file, we'll be able to quickly give the researcher the name of the state he should go to as well as the certificate number he needs," she added.

The proposal was endorsed in June by the American Association of Vital Records and Public Health Statistics, an association of state registrars and other public health statisticians.

As it is now planned, Burnham said, the system would ask for the decedent's name, maiden name or father's surname, age at death, race, sex, marital status, Social Security Number, date of birth, state of birth, state of residence, place of death, date of death, death certificate number and state file number.

The NDI would recommend that a researcher supply at least the decendent's name, father's surname, date of birth and/or Social Security Number in requesting information, Burnham said.

In return, a researcher would get "an indication of which items of information he gave us matched the items we have," Burnham said. The system would not print out the correct information, but would only indicate whether the information matched, she said, "partially because of confidentiality."

The system would, however, offer the correct state of death and death certificate number so the researcher could then go to the right state and seek more information there, she said.

"So in that way the states actually have the final say as to whether or not they're going to release the data to a particular individual."

The screening committee, whose members have not yet been chosen, would include medical researchers, state registrars or other state officials and "probably some NCHS staff as well," according to Burnham.

The proposed system would run on NCHS' 4M-byte IBM 370/158, according to Allen Krieger, computer systems analyst for NCHS.

Under the proposed system, requests would probably be processed every two or three months in batch mode, he noted. "For example, the Cancer Institute might send over some reels of tape to find out if certain people died during a certain period of time."

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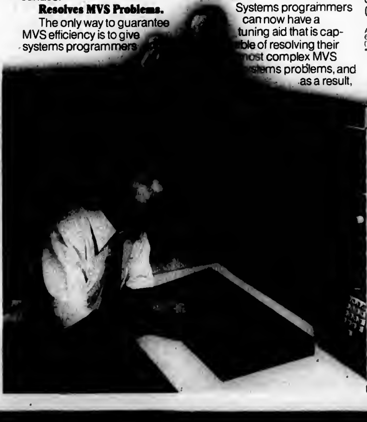

UK Wants Opinions on Distributed Data Bases

LONDON — An open invitation to any interested parties — users, suppliers or other research institutions — to comment on the potential importance of distributed data base techniques and technology during the next 10 years has been issued by a research firm here.

Funded by the UK Department of Industry's Computer Systems and Electronic Requirements Board (Cserb), members of the system development center of PA Computers and Telecommunications Ltd. (Pactel) will also be conducting in-depth interviews throughout this country, continental Europe and the U.S.

The comments may encompass anything which the users or manufacturers deem pertinent. Though they need not be in any particular format —"We are waiting for calls by phone or Telex" as well as written comments — they should reach Pactel by mid-September, a spokesman said.

He also noted that "there is still room" for other interviews, especially in the U.S.-based phase of the project, and that people or organizations interested in taking part should contact Pactel promptly.

Point of Argument

The issue of distributed data bases — whether an organization's entire logical data base should be split up geographically or kept as a single central system — has already become a point of argument and is likely to assume greater importance in the 1980s, the spokesman said.

Largely to gain perspective in directing research and development work in the UK, Cserb has commissioned Pactel to try to identify the different categories of distributed data base design, to estimate the likely timing of their introduction, to decide if they represent an alternate approach or an inevitable mainstream development and to evaluate their potential for specific applications.

Cserb has decided that, though there are several factors and trends which could influence an organization into moving to a distributed base environment, it is difficult now to judge what will act as the trigger and when it will happen, according to Pactel.

For example, the researchers noted, in distributed processing systems, hardware and organizational developments are giving users increasingly more autonomy over their DP facilities. But data base developments have thus far led to the increased centralization of storage and management of data.

The in-depth interviews will require a commitment by one or two people of one to three hours in order to gain meaningful views, the spokesman estimated. The important thing is for interested people to Telex project leader Mike Rappolt at Pactel headquarters (Telex No. 8813082) with their company name, phone number, contact name and a brief description of what they want to say, the spokesman said.

Comments should be addressed to Rappolt at Pactel, Rochester House, 33 Greycoat St., London SWIP 2QF, England.

The results of the study are expected to be ready for distribution "at nominal cost" in early 1979.

Post Office Moving on Electronic Mail

(Continued from Page 1)

postal electronic message system, according to Bolger. For this program, the post office will rely heavily on contractual assistance from the private sector, he said.

The overall plan calls for five phases of roughly three years each. The initial phase to test the concept will end in October of this year and will include an analysis of the technical market and other factors.

This system definition and evaluation study is being undertaken by RCA under a two-year contract, Bolger said. Assistance during this phase will come from Pitney Bowes and Fairchild Camera and Instrument.

The second phase will entail validation of the concept; Phase 3 will include systems development. Phase 4 in 1987 will include design and production of the system, and the final phase — implementation — would be slated about 1990.

Speaking at the hearings for the Computer & Communications Industry Association (CCIA), Philip S. Nyborg said "it is clear the electronic movement of information is not within the Postal Service's present mandate. The Postal Service should be excluded from providing competitive DP services as part of its participation" in electronic message services.

The Postal Service should not move forward into this area until a determination has been made that such participation is in keeping with the goals of national telecommunications policy, Nyborg said.

Taking a more liberal view toward Postal Service involvement was John F. McLaughlin, executive director of the Program on Information Resources Policy at Harvard University. Postal problems are too important to keep the Postal Service categorically and arbitrarily from exploring new opportunities to reduce cost and generate new revenues, he said.

If the Postal Service can convince Congress that it is better suited to provide certain services than AT&T, IBM, Western Union and all the other players from the private sector, more power to it, McLaughlin said. But, he added, the burden of proof for this should lie with the Postal Service itself.

The hearings were held to obtain opinions relating to Senate Bill 3229, a postal reform act that would allow the Postal Service to develop electronic mail and other advanced concepts.

FM No Bargain: Brandon

(Continued from Page 1)

and a cost analysis." That's quite correct, Brandon noted, but added that the client firm is more likely to take a more analytical view of the problem, saying, "What we really want to do is churn our inventory more frequently, and that means we want to keep less in stock, reduce cash flow on the inventory monies and so forth."

Defining FM as "a turning over to a third party (with its own shareholders and profit motivation) the data processing operation and design segments of a business," Brandon said some segments of a business, such as employee medical care, could be turned over in that fashion, as long as the elements turned over were free-standing and not totally integrated into the main business of the company. Another definition, he suggested — only half in jest — was "the abandonment by management of its responsibilities for a segment of its operation."

Better Solution

In any case, Brandon continued, if a company has a management problem, it should not be solved by divesting itself of the operation and giving it to an outside organization to manage. "A better solution, at least to me," he said, "is to get yourself a better manager."

A key operational — as opposed to financial — factor to bear in mind, Brandon believes, is the degree to which a function is integrated with the rest of the business. "The minute you have an operation that is integrated, it becomes difficult to separate it from the rest of the company's operations; and if it's really well integrated — like an interactive, on-line, transaction-oriented system that deals with customers — it becomes entwined, like tentacles, and you can't separate it or move it out."

Separation of the DP activities from the rest of the company's work should be considered in both the design and production phases of a project, Brandon believes. In addition, while some batch systems might be separable, it can be extremely risky to farm out on-line systems. The reason, he suggested, has two parts: First, solutions to a batch system with flaws can be improvised and the system can be "supported with manual fill-ins, such as running extra reports or extracting data in other ways," but an on-line system that interfaces with customers and is integrated into the business cannot be massaged to get around its flaws.

Second, an outside contractor, creating the system on a fixed-fee basis, is not as motivated to work with management as is an internal department.

An example of such integration is an airline reservation system, Brandon suggested.

Can't Cover Everything

It is impossible to spell out contractually, in advance, every design element of a system, Brandon suggested. "Every time somebody says, 'I want a piece of information X,' as an outside vendor I could say, 'That's extra — I'm trying to make a 10% profit here, and you're preventing me from doing so.'

"The facilities manager in general is interested in optimizing his profit, and therefore in providing the threshold level of service that satisfies his obligation. . . . An internal organization might be more motivated to provide a higher level of service."

What about the possibility of letting the facilities manager oversee production and having someone else design and write the systems? In practice, that doesn't work, Brandon indicated, because if someone else is doing the design, a facilities manager is likely to say, "Wait a minute. If you've got a bunch of dodos writing these programs, you're going to increase the processing time, and I can't control that. Many [facilities] managers will therefore [stipulate] that they get the whole thing or none of it."

An article in next week's issue will cover Brandon's views about the facilities management contract between the F&M Schaefer Brewing Co. and Electronic Data Systems (EDS) — a contract that ended in a lawsuit worth several million dollars.

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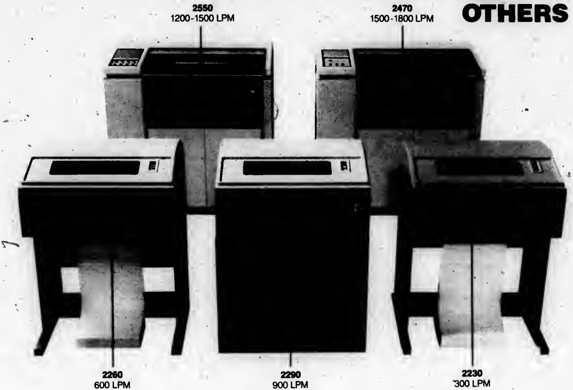

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Five Hospitals Working Together

Tumor Registry Helps Monitor Cancer Trends

Special to CW

BROCKTON, Mass. — A computerized tumor registry here is giving physicians at five area hospitals valuable information on the local incidence of cancer and the effectiveness of diagnostic and treatment programs.

By analyzing computer-prepared reports that show observed and relative survival rates for area cancer patients, physicans can better assess the need for cancer screening tests and the effectiveness of alternative forms of treatment. The reports also enable the doctors to compare area cancer survival statistics with those compiled by the National Cancer Institute.

Brockton Hospital, a 322-bed, not-for-profit community hospital, started a manual tumor registry in 1970. It provided annual cancer follow-up and statistics on cancer incidence.

In 1975, however, the growing number of cancer patients made it virtually impossible for one tumor registrar to keep up with the manual recordkeeping. Physicians wanted more statistics and information related to their specialities.

Three other area hospitals — Cardinal Cushing General Hospital, Goddard Memorial Hospital and South Shore Hospital — were interested in joining Brockton in establishing a combined registry that would allow an interhospital comparison of treatment and type of cancer. (The fifth, Cape Cod Hospital, joined later.)

Two Years' Hard Work

A Regional Cancer Committee made up of physicians, administrators and medical records directors from the four hospitals began investigating the possibility of a computerized registry, according to Stephen L. Priest, data systems director at Brockton Hospital.

"Brockton Hospital's manual system was very good," Priest said, "but it would have been impossible to continue manually and expand into a regional tumor registry. Our registrar was hard-pressed to follow 2,000 patients."

Brockton Hospital's DP staff was asked to program its NCR Corp. Century 200 computer to automate the registrar's information processing workload. That was the start of two years of hard work that produced very worthwhile results, according to Priest.

The computerized registry tracks more than 5,000 patients and about 1,200 new patients are added to the system each year.

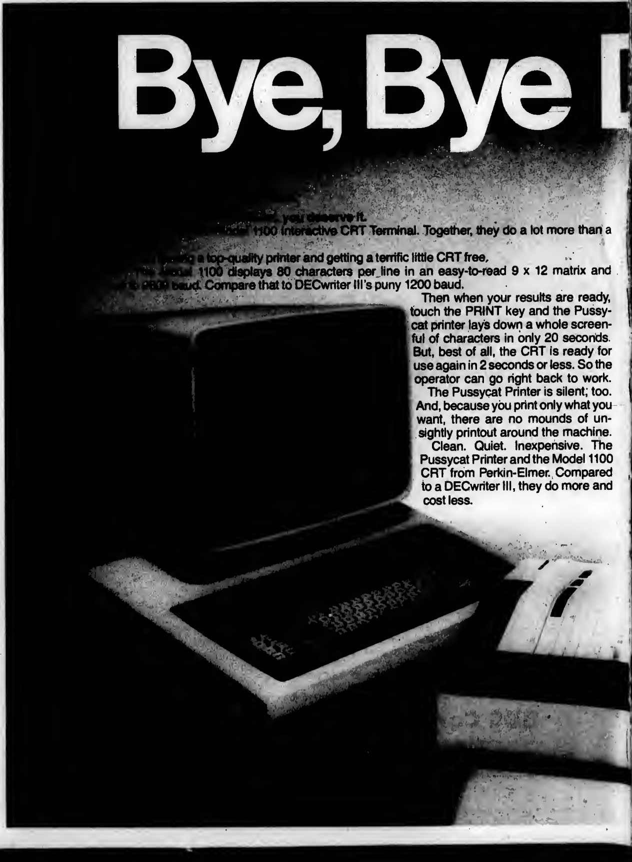
"The computerized information is more accurate and easier to use, too. Reports have been standardized to permit year-to-year comparisons. Uniform coding procedures and computer editing techniques assure the same patient isn't entered twice or a male patient isn't mistakenly entered as having a female-type cancer, Priest explained.

Each month the registry produces 10 standardized survival reports for each of about 100 types of cancer. The individual reports related to one type of cancer show the survival experience for each hospital as it relates to patient age, sex, type of treatment, tissue structure, location of the primary tumor and the stage at which the cancer was discovered.

Observed cumulative survival rate statistics also are adjusted for age, sex, and race factors that affect the normal mortality rate for patients being monitored. Area incidence reports reflect whether certain types of cancer are on the increase or decrease.

The registry helps physicians recognize trends in cancer incidence in the area and take action. For example, if a certain type of cancer is consistently being detected in late stages, physicians may recommend that tests for this cancer be incorporated in annual physicals, or they may mount a public information campaign to increase awareness of early warning signs, Priest said. "The physicians also

(Continued on Page 14)



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Driver Register Underused; DP Project Slated

Washington Update

By Edith Holmes
CW Washington Bureau

WASHINGTON, D.C. — A computerized registry of the nation's drunk and reckless drivers isn't being used by enough states to keep these drivers off the roads and highways, according to a recent General Accounting Office (GAO) report.

The GAO study contended that some states consult the National Driver Register (NDR), which is maintained by the National Highway Traffic Safety Administration (NHTSA), rarely, if at all, in deciding whether to grant driver's licenses. In 1976, for example, Florida made 10 inquiries of the batch, sequential system; New York, 802; and California, none. Texas, on the other hand, made almost 3.5 million inquiries, the GAO noted.

The lack of state use of the register is based, in part, on the need for "up-to-date, essential data," the report said. NDR officials have been working for nearly two years to develop an on-line system for the register [CW, Mar. 21, 1977].

The U.S. House of Representatives has approved NHTSA's request for $440,000 to demonstrate the rapid response system with four states. The project will begin in October 1980 and run for a year, according to Jim Lockard, NDR project leader. The Senate has yet to give its blessing to the scheme.

Currently testing program modules for the streamlined register, Lockard said the demonstration will show whether NDR has come up with a system that can distinguish between safe and dangerous drivers with the same

(Continued on Page 12)

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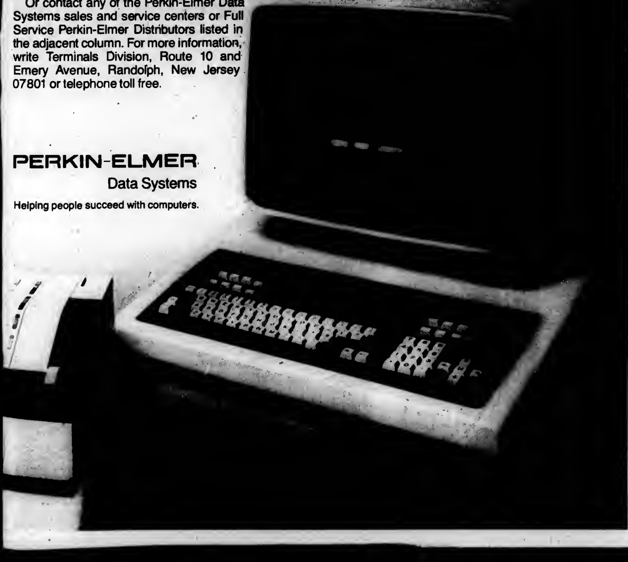

National Driver Register Underused: GAO

(Continued from Page 11)

or similar names. Mathematically, the name-search algorithms developed for NDR ought to work, he added.

State participation in NDR — keeping state records up-to-date and then using the system — is voluntary. The GAO suggested this is another reason for the spotty use of the register.

NDR should describe to the states the information they should submit to improve system effectiveness, the report stated. "These instructions should emphasize to the states that, to a large degree, the driver registration system can only be as effective as they wish to make it," the GAO said.

Rep. James L. Oberstar (D-Minn.) doesn't believe a voluntary program will work, however. He has introduced an amendment to the Surface Transportation Assistance Act of 1978, a bill now before the House, that would make state participation in NDR mandatory.

States would be required to query NDR about all driver's license applicants. In addition, Oberstar's proposed law would force the states to send to the register all records on license suspensions and revocations and on convictions for drunken driving and for driving under the influence of such "controlled substances" as heroin, a congressional spokesman said.

The amendment's chances of passage along with the rest of the transportation act are unknown at this time. The states generally oppose mandatory participation in NDR because of the funds many would have to commit to upgrade their manual and computer environments to send and receive register data, the spokesman stated.

House Members Test Nutrition System

What could be more basic than a line of 40 people waiting to be served ice cream or iced tea on a hot summer day? A line of 40 people waiting to use a microcomputer system to find out whether their eating habits make nutritional sense.

That's what The Pillsbury Co. discovered when it brought its nutrition education program to Capitol Hill for a demonstration before the House Science and Technology Committee's Subcommittee on Domestic and International Scientific Planning, Analysis and Cooperation.

During recent hearings on the adequacy and usefulness of recommended dietary standards, congressmen, staff and spectators queued up to test their diets on the Digital Equipment Corp. 1103 microcomputer-based system. The system was there all day, according to Scott Hippe, the senior associate scientist at Pillsbury responsible for developing the program.

Hippe worked on the system, which includes a Microterm keyboard and can accommodate a range of video monitors, "for about a week." The program depends on a nutritional data base consisting of more than 130 of the most popular and frequently eaten foods, according to Pillsbury.

The system has been in use for the past six months at the science museum of the downtown Minneapolis Public Library.

More than 100,000 people have executed the program since it was installed in the museum last January, Hippe said. Pillsbury has found that only 1% of these "users" are "smart eaters." Seventy percent of those who tested their diets on the program were told they need to eat more enriched or whole grain breads and cereals, and 54% discovered they should consume more fruits and vegetables.

The Minneapolis museum has asked that the nutrition system's one-year engagement be extended for three to five years, and Pillsbury has been asked to provide the program to schools throughout the U.S.

Testifying before the House Subcommittee, Pillsbury vice-president of science and technology Dr. Howard E. Bauman suggested that using computers to educate people about nutrition is far more "acceptable" than laws restricting the availability of foods or food calories.

House Curbs DP Use As Campaign Tool

The House Administration Committee has adopted a policy governing congressmen's use of computers and franked (free) mail to manipulate the voters back home. It's not permitted.

The new rule by which members of Congress must now live ties congressional use of computing power to franked mail privileges. Names or addresses of constituents, generated by a congressman's office computer, can't go on an envelope unless the piece of mail bears the member's frank. And congressmen can't use their free mail allowance to wage a reelection campaign against an opponent.

The use of computers and computer services paid for with taxpayers dollars became an issue in this election year when several incumbents seeking a return to Capitol Hill this November were accused of using lists maintained by these systems for campaign mailings [CW, April 3].

While not illegal, the use of office computers by congressmen hoping for reelection struck the House Administration Committee's Policy Group on Information and Computers as an ethical problem. The policy group hammered out the policy adopted unanimously by the full committee earlier this summer.

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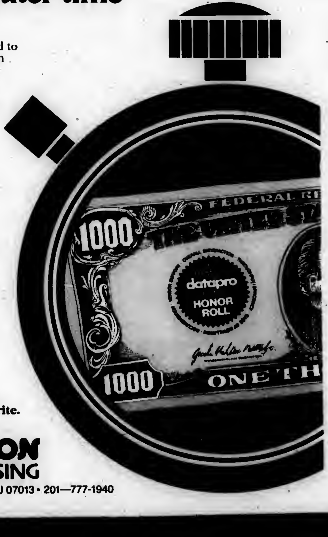

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Programmers Wanted Most

Demand for DP Specialists Rises 12% in 1978

SEATTLE — The demand for data processing specialists has jumped 21.7% over 1977, with a 12.4% increase in their salaries, according to a survey of more than 4,850 firms across the U.S. The survey was conducted by National Personnel Consultants (NPC), a network of 100 professional recruitment firms.

In terms of the educational levels of DP personnel, the trend is away from nondegreed operator personnel toward people with more sophisticated backgrounds, the survey found.

Programmers are at the top of the demand list, followed closely by systems analysts, telecommunications specialists, new computer science graduates, accountants with computer know-how and various levels of DP managers, according to the survey.

The report showed that demand is particularly heavy for programmers with two to five years experience. This partly reflects the fact that many employers interrupted their hiring and training of programmers during the 1972-75 recession years, according to Jan Sheppard, an associate with Career Specialists, Inc. and NPC member.

Another reason for the high programmer demand is that employers are acquiring more sophisticated hardware which must be analyzed and managed by more operationally sophisticated programmers, Sheppard said.

Programmers' salaries have increased by a larger percentage than the overall salaries for DP personnel, the survey showed. Salaries for programmers this year have increased 16% to 18% over last year.

Specialists with proven skills in telecommunications and in DP auditing, although less in demand in sheer quantities, have also registered 1978 gains of almost 20% over last year, according to the report.

Computer science graduates with bachelor of science degrees are commanding as much as $19,200 per year to start in some areas of the U.S. and senior managers are regularly offered salaries in the $30,000 to $60,000 range, up more than 20% over 1977, the study indicated.

Of all the factors contributing to the current demand-over-supply personnel imbalance in the DP field, Sheppard said, none is more far-reaching than the "rapid and revolutionary technological strides constantly being made within the $41 billion-a-year computer business itself."

In a future in which computers will become even more ubiquitous, Sheppard foresees salaries increasing at a steady rate. "As data processing departments in more companies grow to multipersonnel operations with more important functions, salaries will move up even more dramatically than at present levels," she predicted.

Tumor Registry Monitors Trends

(Continued from Page 10)

may find that survival statistics indicate one treatment alternative is more successful than another," he continued. "One radiologist, for example, had long believed a certain type of cancer could be treated more effectively with a combination of radiology and chemotherapy. The reports supported his belief."

Skepticism Overcome

The American College of Surgeons (ACS) has given the computerized registry three-year accreditation. However, before the ACS representative looked at the system, he voiced his skepticism, saying he had yet to see a computerized registry that worked as billed. This registry's capabilities changed his mind, Priest said.

Eighteen months of careful groundwork are responsible for the registry's success, he believes. "The physicians thought programming the computer should be the first step," he recalled. "I really had to fight to put it off, but I knew programming should be one of the last measures."

Priest recommended that others follow the same developmental sequence:

- Get the users to agree on what the output of the system should be. Only after this is defined is it possible to decide what input information is needed, he said.
- Involve physicians in all specialities in developing codes that assure accurate, uniform description of the stage when the disease is first diagnosed so the input data will be standardized.
- Design and test data collection forms which can be used to easily translate information on medical records into a data entry format.
- Program the computer and examine the initial output to see what modifications are needed. It was at this point that the Regional Cancer Committee and Priest decided the computer's editing capabilities could be used more fully to prevent transcription errors and the insertion of illogical data.

The computerized registry developed at Brockton also is in use at hospitals in New Jersey, North Dakota and South Carolina. Other hospitals in Massachusetts are expected to join in the regional effort.

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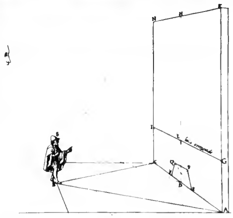

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August 2, 1978

Calendar

Sept. 6-8, New York — **Data Communications: An Introduction to Concepts and Systems**, sponsored by Datapro Research Corp. Contact: Seminar Department, 1805 Underwood Blvd., Delran, N.J. 08075. Also being held Sept. 20-22 in San Francisco.

Sept. 6-8, Washington, D.C. — **Data Base Management Systems: General Concepts and Planning Guidelines**, sponsored by Datapro Research Corp. Contact: Seminar Department, Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

Sept. 6-8, Washington, D.C. — **Word Processing: Guidelines for Planning, Design and Implementation**, sponsored by Datapro Research Corp. Contact: Seminar Department, Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

Sept. 11-12, Washington, D.C. — **Minicomputers and Small Business Computers: Selection and Usage Guidelines**, sponsored by Datapro Research Corp. Contact: Seminar Department, Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075. Also being held Sept. 25-26 in Chicago.

Sept. 13-15, Washington, D.C. — **Computer Performance Measurement: Tools and Techniques for Increased System Productivity**, sponsored by Datapro Research Corp. Contact: Seminar Department, Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

Sept. 13-15, San Francisco — **Integration of Word Processing and DP Systems**, sponsored by Datapro Research Corp. Contact: Seminar Department, Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

Sept. 13-15, New York — **Data Communications: Effective Network Design**, sponsored by Datapro Research Corp. Contact: Seminar Department, Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

Sept. 18-19, New York — **Understanding Proprietary Software and How to Buy It**, sponsored by Datapro Research Corp. Contact: Seminar Department, Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

Sept. 18-20, Chicago — **Effective Computer Operations Management**, sponsored by Datapro Research Corp. Contact: Seminar Department, Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075. Also being held Sept. 25-27 in San Francisco.

Sept. 19, Hartford, Conn. — **EDP Auditors Association/Greater Hartford Chapter Meeting.** Contact: Alan H. Nirenberg, Price Waterhouse & Co., One Financial Plaza, Hartford, Conn. 06103.

Sept. 20-22, Washington, D.C. — **Telecomputer Application Group Conference**, sponsored by Telecomputer Applications Group. Contact: Hollis J. Sobers, Allied Chemical Corp., P.O. Box 1039R, Morristown, N.J. 07960.

Sept. 20-22, Arlington, Va. — **Networking '78: Fall Seminar of the Telecomputer Application Group.** Contact: Hollis J. Sobers, Allied Chemical, P.O. Box 1039R, Morristown, N.J. 07960.

Sept. 20-22, New York — **Data Base Management Systems: A Comparative Analysis**, sponsored by Datapro Research Corp. Contact: Seminar Department, Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

Sept. 20-22, Los Angeles — **Data Processing: An Introduction to Concepts and Systems**, sponsored by Datapro Research Corp. Contact: Seminar Department, Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

Sept. 21-22, Cedar Rapids, Iowa — **Institute of Electrical Engineers (IEEE) 25th Fall Conference**, sponsored by the Cedar Rapids IEEE Section. Contact: B.F. Rider, IEEE Fall Conference, P.O. Box 451, Marion, Iowa 53202.

Sept. 21-23, Bologna, Italy — **Symposium on Interactive Techniques in Computer-Aided Design**, sponsored by IEEE Computer Society. Contact: Dr. Bertram Herzog, Computing Center, University of Colorado, Boulder, Colo. 80303.

Sept. 24-29, Milan, Italy — **Exhibit of Business Equipment and Systems**, sponsored by the U.S. Department of Commerce. Contact: Marcia J. Griffin, U.S. Department of Commerce, Industry and Trade Administration, Room 1014, Washington, D.C. 20230.

Sept. 25-26, Washington, D.C. — **Conference on Distributed Data Processing**, sponsored by the American Institute of Aeronautics and Astronautics and the Data Processing Management Association. Contact: AIAA Conferences, P.O. Box 91295, Department DDP, Los Angeles, Calif. 90009.

Sept. 25-27, New York — **Distributed Systems: Are They Right for You?**, sponsored by Datapro Research Corp. Contact: Seminar Department, Datapro Research Corp.; 1805 Underwood Blvd., Delran, N.J. 08075.

Sept. 25-27, New York — **Increasing DP Usage and Benefits Through Organizational Communications**, sponsored by Datapro Research Corp. Contact: Seminar Department, Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

Sept. 25-27, Washington, D.C. — **Effective Data Systems Development**, sponsored by Barnett Data Systems. Contact: Arnold Barnett, Barnett Data Systems, 19 Orchard Way North, Rockville, Md. 20854.

Sept. 25-27, New York — **Conference on Data Entry**, sponsored by the American Institute of Industrial Engineers (AIIE). Contact: Dept. PR, AIIE Seminars, P.O. Box 3727, Santa Monica, Calif. 90403.

Sept. 25-29, New York — **The James Martin Seminar on the Design, Management and Future of Distributed Data Bases and Networks.** Contact: The Worldwide Media Consultancy, 9/10 Kendrick Mews, London SW7 3HG, England.

Sept. 26-29, Kyoto, Japan — **Fourth International Conference on Computer Communication**, sponsored by the International Council for Computer Communication (ICCC). Contact: ICCC-78 Executive Committee, c/o International Affairs Bureau, Nippon Telegraph & Telephone Public Corp., 1-6 Uchisaiwai-cho, 1-chome, Chiyoda-ku, Tokyo 100, Japan.

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Managers on the Move

JOHN W. SWEENEY has been elected assistant vice-president of Suburban Propane Gas Corp. of Roseland, N.J.

Sweeney joined the company's DP department in 1959 and is presently director of management information systems.

A graduate of Fairleigh Dickinson University with a bachelor of science degree in accounting, Sweeney is currently president of the Metropolitan Honeywell Users Association.

• • •

DAVID E. MATTSON has joined Sterling Drug, Inc. in New York as director of systems development in the company's corporate management information systems department.

Mattson came to Sterling from Allied Maintenance, where he was director of systems and data processing.

Holder of a B.S. degree in electrical engineering from the University of Pennsylvania, he also earned a master's degree in business administration from that university's Wharton School.

• • •

JAMES N. LONGSON, DP manager at Sentinel Star Co., publisher of the *Sentinel Star* in Orlando, Fla., has been named to the newly created position of DP director.

Longson attended Florida Atlantic University in Boca Raton and joined Sentinel in 1970 as a programmer.

• • •

MICHAEL R. EGOLF has been promoted to assistant vice-president for management information systems at Danners, Inc. in Indianapolis, Indiana.

Egolf, who has been with Danners since 1963, was formerly director of the firm's management information systems department.

The 1970 graduate of Valparaiso University holds an M.S. degree from Purdue University in business administration and computer science.

• • •

STEPHEN S. BERRY has been appointed senior vice-president and director of the Information Services Division, DAVID L. MacDONALD has been named vice-president and manager of the information processing department and C. DAVID VACHET was named vice-president and head of the information development department at First Federal of Broward in Fort Lauderdale, Fla.

Berry joined the savings and loan institution a year ago as vice-president directing research, development and data processing. He was previously vice-president of the Management Information Division of the Girard Bank in Philadelphia.

MacDonald worked with the City of Fort Lauderdale and with RCA and General Electric before joining the association in 1977.

Vachet was manager of programming and software for a Richmond, Va., retail firm before joining the association.

• • •

ROGER K. BORKENHAGEN has been named manager of information systems for Butler's Shoe Corp. in Atlanta, Ga. Borkenhagen has been associated with Butler's for three and a half years.

• • •

ROBERT E. HERLIHY has been elected a corporate vice-president of W.R. Grace & Co., the international chemical company headquartered in New York.

M.R. Egolf

Herlihy will continue to head Grace's Computer Technology and Operations Division, which covers both DP and management science.

Prior to joining Grace in 1968 as director of management science, Herlihy spent 10 years with the General Electric Co.

He holds a B.S. in civil engineering from Tufts University.

• • •

J.N. Longson

KENNETH J. PANZARELLA has been named director of information systems for Avco Corp. in Greenwich, Conn.

Panzarella joined Carte Blanche Corp., a division of Avco's major financial services subsidiary, in 1971. He has been vice-president of the credit card company's Information Systems Group in California since 1974.

Panzarella attended the University of California at Los Angeles and the University of Buffalo.

• • •

DAVID C. GERLAND has been appointed director of Sterling Drug, Inc.'s corporate data center in East Brunswick, N.J.

Gerland joined Sterling's Lehn & Fink Products Co. division in 1967 as a senior programmer and, after a series of promotions, was named manager of information resources for Lehn & Fink in 1973.

In January of this year he became manager of corporate applications systems programming.

Gerland attended Kent State University.

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system's performance.

If your 100/200 MB removable disc storage subsystem isn't giving you all the performance you want; then Memorex's new 3770 Disc Cache could be just what you need.
It fits between your drives and controller, filling the gap in your system's performance by giving you faster data access and improved throughput.

Compare performance data for a 3770 Disc Cache Subsystem to a current 200MB Disc Storage Subsystem. For example, on the average, the time to access a full track of 13030 bytes from the 3770 is:
Track seek time:
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2.0ms vs. 8.3ms,
and data transfer time:
10.9ms vs. 16.7.

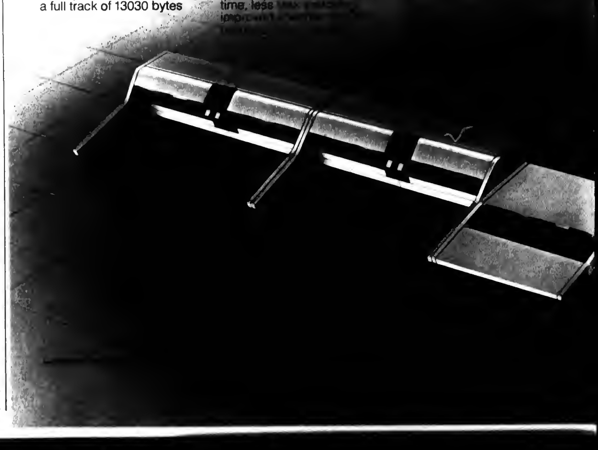
Thus, for data in the 3770 Disc Cache, significant increases in throughput at the channel level can be achieved. In fact, a 50% improvement in your data transfer rate is guaranteed when the Memorex® 3674 control unit is used.

Potential benefits from proper application of the 3770 can be less CPU [illegible] time, less [illegible] [illegible]
automatic space management, and better time sharing response.

And putting a 3770 to work for you is easy, because full software compatibility is maintained.

The Memorex 3770 Disc Cache works with IBM 370/135 and above, Amdahl 470 V/5 to V/7, Itel AS-4 to 6, and other compatible CPUs. In short, any CPU with a Memorex 3670/75 Disc Storage Subsystem.

The key to ultimate per- [illegible]



October Information Management Show Set

CHICAGO — Eighty sessions concentrating on the science of information management as well as an extensive display of comuterized word-processing equipment will highlight the Information Management Conference & Exposition at McCormick Place here Oct. 16-19.

The conference and show are designed to examine management's role in information collection, retrieval and dissemination. They will also focus on choosing the right equipment and programs for DP, word-processing, telecommunications, duplicating and micrographic systems, according to Clapp & Poliak, Inc., the sponsors of the conference.

The conference will be divided into three major tracks: "Information Management," "Advances in Information Technology" and "Office Automation." Each conference session will attempt to provide guidelines for broadening the information manager's role by applying newly developed technologies to the processing and utilization of information in his organization, according to a spokesman.

Several sessions will be aimed at small business management and financial officers who deal with information-related problems on a smaller scale.

Session topics include "Information Systems Planning for the 1980 Corporate Environment," "Managing the Proliferation of Minicomputers," "Planning for Disaster Recovery," "Computer and Communications Security for DP" and "Data Administration."

In addition, William Mueller, vice-chairman of Arthur Andersen & Co., will discuss recent advances in techniques of capital budgeting, productivity analysis, risk assessment and "what-if" modeling based on developments in computer technology.

Registration fees for the conference, which include admission to the exhibit floor, are $225 for the four days, $80 for one day and $45 for a half-day or single session. Individual admissions to the exhibit floor cost $5 or $1 with advance ticket registrations.

Early registration for the conference is recommended, the spokesman said from Clapp & Poliak, 245 Park Ave., New York. N.Y. 10017.

At Annual Meeting

Apec to Focus on Energy

DAYTON, Ohio — This year's meeting of Automated Procedures for Engineering Consultants, Inc. (Apec), slated for Nov. 16-17 in San Diego, will focus on the "state of the art" and "art of the state" in computer-aided design hardware and software.

The meeting, open to all who are interested in the applications and theory of computer-aided design, will explore methods of overcoming the design burden imposed by the need to reduce the energy use of new buildings to the level specified by government agencies, a spokesman said.

A program called Energy Simulation Program-Level I (ESP-I), structured by Apec, will be described in relation to those recent government requirements limiting energy usage.

Representatives of the U.S. Department of Energy, the State of California Energy Resources Department and the Conservation and Development Commission will discuss issues and answer questions pertaining to the implementation and goals of energy performance standards.

In addition, research geophysicist Dr. M. King Hubbert, will speak on the current status and future sensitivity of the world's finite energy supply.

Registration fees for the annual meeting, which is the 13th held by Apec, are $90 for both members and nonmembers. Information can be obtained from Apec's headquarters at Suite M-15, Grant-Deneau Tower, Dayton, Ohio 45402.

System Brings Energy Savings

SAN FRANCISCO — Eight organizations in the Bay Area have reportedly saved enough electricity in their buildings in one year to power 1,220 homes for a year and enough gas to heat 365 homes for a year.

The seven businesses and one hospital involved did so with the help of Honeywell Information Services, Inc.'s Building Operation Services System (Boss).

First-year results showed that, in addition to the energy saved, the organizations cut $373,054 from their utility bills.

All are linked to the computerized monitoring center in San Francisco where, through the use of remote sensors, heating, cooling, lights and other equipment are continuously watched and controlled.

The firms participating in the program were Stauffer Chemical, Richmond, *The Press Democrat*, Santa Rosa, Physics International, San Leandro; Monsanto, Palo Alto; Safeco Insurance, Burlingame; Teledyne, Mountain View; and the Ralph K. Davies Medical Center and HIS in San Francisco.

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The Memorex 3770 Disc Cache. It can help achieve improved throughput without incurring the cost of converting to non-removable 317MB drives with the fixed head feature or to fixed head disc drives. And it gives you the potential of significantly improving your system's performance.

Your Memorex representative can give you all the information, offices in principal cities worldwide. Or contact, Disc Storage Subsystems, Mail Stop 14-49, San Tomas at Central Expressway, Santa Clara, CA 95052. (408) 987-1143

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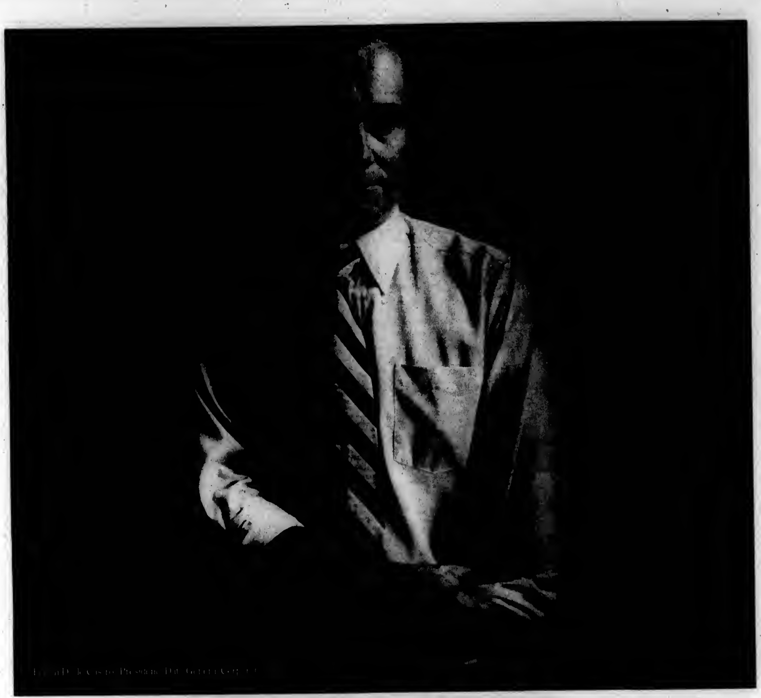

Edson D. de Castro, President, Data General Corporation

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DP Mapping Remedies Managers' Tunnel Vision

By Tim Scannell
CW Staff

BOSTON — Most managers in today's information-inundated world suffer from a myopia that limits their focus of attention to individual "trees" in a veritable "forest" of corporate decisions, according to Dr. Allan Schmidt, director of the Harvard University Laboratory for Computer Graphics and Spatial Analysis.

Fortunately, Schmidt claimed, there is an available and relatively painless cure for executives plagued by managerial tunnel vision. That remedy is computer mapping.

The science of reducing reams of data to compact, understandable maps and pictorial representations was the topic of a recent week-long conference here sponsored by the laboratory.

Although undeniably beneficial, the computer's ability to collect and store large amounts of information has resulted in an increased burden of responsibility on the shoulders of management, conference chairman Schmidt said. A manager's job is no longer limited to just knowing what's going on, but involves identifying trends, making projections and "searching for (key) relationships over time and over space." The whole realm of "management science," he continued, depending upon seeing the entire informational picture on which to base decisions and effectively plot the rate, direction and magnitude of corporate change.

'Universal Language'

Graphics, Schmidt added, is a "universal language" that spans all ages and backgrounds. Management's "mapavision," or ability to represent information in graphic form, will eventually generate the development of an "everyman's map" which will idealistically display data on "any subject, any time and any place."

Single maps or "static presentations" will also give rise to "dynamic" multiple illustrations, Schmidt noted. These series of pictorial representations, in the form of videotapes, animated films and the like, will serve to stimulate solutions through a more vivid portrayal of the problems at hand.

Mapping, along with computers and communications, will also play an important role in the controversial "office of the future," Schmidt observed. The interaction of these three forces will help grind raw facts and data into usable information that can, in turn, reduce the uncertainty about a product or corporate endeavor.

Schmidt recommended, however, that companies interested in using computer graphics in the decision-making process first identify and investigate those areas relative to the importance of the technique. Management should be aware of what data is available in terms of location in the data base and how this information is accessed.

Hardware is also an important consideration because the selection will influence the type of software that will be implemented and its inherent capabilities, Schmidt stated.

Computer graphics systems are available in software packages that are customized to the user's particular hardware and operational requirements or as complete hardware/software configurations, Schmidt explained. However, very few firms offer complete turnkey systems, he said, and potential users become disenchanted with graphics in general because they are forced to mix and match components.

The toughest job, by far, will be selling the system to company officials who tend to see the endeavor as simply another expense, Schmidt pointed out.

Finally, the responsibility for implementing the mapping system should not rest with the DP department, but with people such as those in marketing research, who will see the final results, Schmidt said.

Library of Congress Offers Guide to '76 Copyright Act

WASHINGTON, D.C. — The Library of Congress has produced a comprehensive "General Guide to the Copyright Act of 1976," available free on request.

The 130-page publication includes chapters covering historical background, federal preemption and duration of copyright and eligibility for copyright protection in the U.S.

A chapter on copyright subject matter includes a section on the standards of copyrightability, which interprets the law to include software.

In explaining the law, the guide notes: "The definition of 'literary works' refers to works expressed in 'words, numbers or other verbal or numerical symbols or indicia.' "

Other chapters deal with the scope of exclusive rights accorded copyright owners, fair use and other limitations and exemptions on exclusive rights and notice of copyright.

Among the four appendices is a chart comparing the Act of 1909 with the Act of 1976. Another appendix presents an overview of the copyright law itself in outline form.

The publication is available from the Copyright Office, Office of Public Affairs, Library of Congress, Washington, D.C. 20559.

"Adding a Memorex 6358 Semiconductor Memory doubled our capacity and boosted throughput by 20%."
–Ron Gossman

Mr. Gossman is Operations Manager for Brown & Williamson Tobacco Corp., the nation's third largest tobacco company. Headquartered in Louisville, Kentucky, the company's data processing facilities include two System/370 mainframes, operating both batch and teleprocessing applications.

"Prior to adding the Memorex memory, our first shift was experiencing long delays in job execution. We realized the problem wasn't with the CPU, but that throughput was blocked by paging. We were exceeding a rate of 20 pages per second. But with the addition of the 6358 Memory System, our paging rate was cut to less than one page per second."

The Memorex® 6358 doubled the main memory capacity of Brown & Williamson's System 370/158 to two megabytes.

"In selecting Memorex's add-on memory, we initially studied equipment from five major manufacturers.

"Two factors swung us to Memorex. First, we already had Memorex 1270 Terminal Control Units and were satisfied with their performance and Memorex service. And second, we felt certain technological features of the Memorex 6358 made it more reliable and functional for us. An additional plus was Memorex's short delivery time.

"The added capacity and reduced paging rate allow jobs to run faster. We can now meet a much greater demand for computer services, such as our new marketing data base.

"The Memorex add-on has done exactly what we expected."

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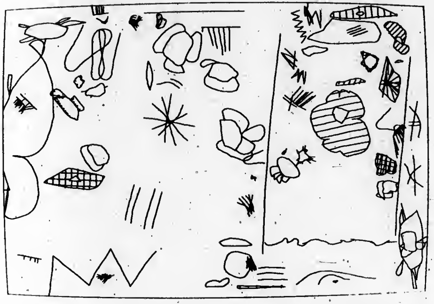
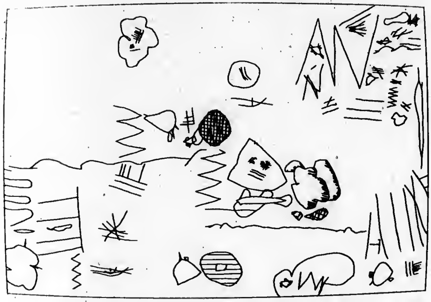
The Process — Not the Medium — The Message of Harold Cohen





By Ann Dooley
CW Staff

SAN DIEGO — An artist here is using a computer to examine some of the underlying thought processes that occur in the human mind while creating a work of art.

The artist — who refuses to be labeled "a computer artist" because he believes most of what is called computer art is "acutely boring" — is Harold Cohen, professor of visual art at the University of California here.

Cohen is working to create more computer-original art by programming a system with several hundred rules for image making so the computer can produce its own artwork, either on a printer or by driving a four-wheel "turtle" across a sheet of paper.

Cohen does his development work at a Tektronix, Inc. 4014 graphics display terminal using an 8080 type of microprocessor sytem, but the turtle does the "drawing" and is used primarily in conjunction with drawing demonstrations because, in Cohen's philosophy, the process is part of the art.

"Showing the machine drawing, or even showing the machinery making drawings without revealing what is actually going on, would be like 'revealing' one's paintings wrapped up in brown paper," he said.

Cohen contrasted his work with the more typical types of computer art today which are derived from compuer programs mathematical formulas that transform a basic drawing that has been programmed into the computer.

Sonar Navigation

The rest of the hardware this artist uses consists of a disk-based Digital Equipment Corp. PDP-11/40 minicomputer with 64K words. The turtle, equipped with a pen for drawing, receives its drawing instructions from the PDP-11/40 via a long cable, allowing it full freedom of movement. Since there is no preset artwork stored in the system, no two images drawn by the turtle are ever alike, Cohen explained.

When using the turtle, the system tells it where to move by sending it commands to operate at various speeds and in short curves.

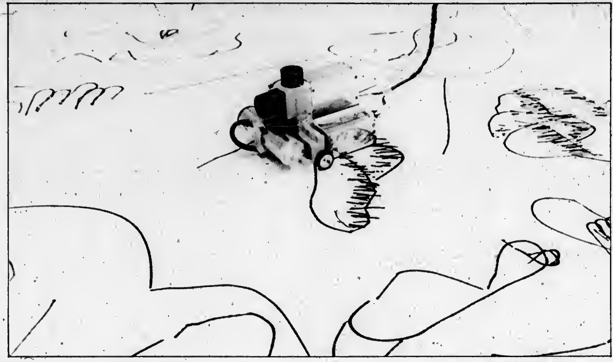
The turtle is equipped with a sonar navigation system that enables the minicomputer to know exactly where the device is at all times. Twenty times a second, the turtle sends out an ultrasonic noise. The microcomputer determines where the turtle is by measuring how long it takes the noise to reach the four corners of the drawing and relaying that information to the mini.

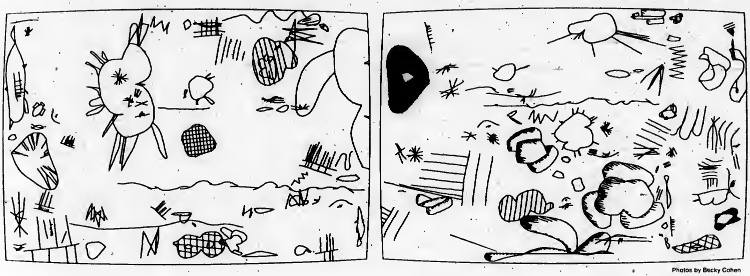
Feedback Process

"Instead of using the method that says, 'Go to Point X,' the main computer says, in effect, 'Move the left wheel and the right wheel and then say where you are,' " Cohen explained. The whole process is essentially a feedback process and corrections can be made as the drawing is being done, he added.

The program was designed to simulate hu-

The two works above were drawn this year by Cohen's computer program, called "Aaron," and photographed off a Tektronix 4014 display. Cohen is shown (right) at the console of a Digital Equipment Corp. PDP-11/60, also used occasionally.





Photos by Becky Cohen

The top photo on this page shows the turtle at work at the Stedelijk Museum in Amsterdam. The two works side by side, above, were drawn by "Aaron." Below, Dutch children watch the turtle draw.

man behavior which occurs in a series of steps and thought processes, according to Cohen. The system is programemd hierarchically so it might be deciding what the next step in the current line should be, planning what the next figure will begin with and finding space to continue — all in relation to the overall development of the drawing.

The computer is valuable because of its explicitness; with a computer program, it's possible to determine what part of the program is responsible for what result, something that is not possible to do with human behavior, especially one's own, the British-born artist said. "That was actually the reason I became interested in computers," he said.

Many of the issues Cohen deals with are those he dealt with as a painter, he said. With the computer it's possible to study the methods humans use when they draw.

"I was using the machine for quite a long time before it ever occured to me that I could use it for making drawings, just because I was interested in the machine itself," he said.

Cohen began his work while at the Stanford Research Institute's Artificial Intelligence Laboratory. Program development took him about five years, he said, although he hastened to note that new rules are continually being added to the program.

At the beginning of his work, the system was programmed only to draw little closed forms and keep making additions to those. But now, with the 300 or more rules, it is possible to draw more sophisticated and varied shapes, he said.

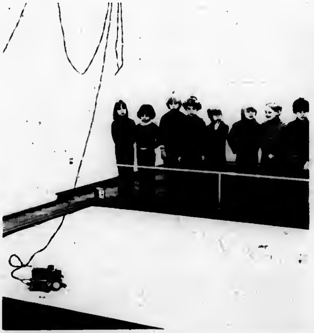
The rules to which Cohen referred are those he programmd into the computer, such as not drawing over something already drawn and finding a different route if another figure is approaching.

It would cost about $2,000 to replicate the turtle navigation system, but that doesn't account for all the time involved, Cohen noted.

Exhibits in Europe

Cohen exhibited the artwork in two European exhibitions last year, one in Germany and the other at the Stedelijk Museum in Amsterdam. While in transit from Germany, some of Cohen's equipment was damaged beyond repair, but DEC in Holland helped him avoid a near disaster by lending him a PDP-11/34 so he could demonstrate his sys-

(Continued on Page 26)



Afips Launches Projects Related to DP History

MONTVALE, N.J. — The American Federation of Information Processing Societies (Afips) is launching a number of activities concerned with the history of computing and may establish a permanent center for this study.

The activities are being administered by the Afips History of Computing Committee, chaired by Jean E. Sammet. They include development of audiovisual teaching aids and the annual Pioneer Day program featured at each National Computer Conference; volunteer support to the Smithsonian Institution on computing history matters; and "encouragement and assistance" to Afips constituent societies on "special conferences, sessions and preservation of their own archives," Afips said.

The "Center for the History of Computing" now under discussion would serve as "a central coordinating office for archival and other historical functions" performed by the federation, an Afips source added.

"Center," a Clearinghouse

The "center" would actually be a network of autonomous affiliated libraries and study facilities primarily located at universities, museums or governmental institutions, the source explained. However, "a professionally-qualified director supported by a small staff" will probably administer the center as an information clearinghouse.

"Few fields of modern endeavor have had so profound and revolutionary an impact on society as computers. Without adequate preservation of our history, we may unduly limit our future," according to Sammet, a past president of the Association for Computing Machinery.

"The concept of the Center for the History of Computing will enable Afips to meet its responsibillties in this area while taking cognizance of other work, activities and groups concerned with preserving and using computing history," she added.

In all its endeavors, Sammet's committee is working closely with University of Michigan Prof. Bernard A. Galler, the Afips source sald, noting Galler is editor-in-chief of *Annals of the History of Computing*, a new Afips journal.

Representing academia on the committee are Galler, Arnold A. Cohen of the University of Minnesota, James Van Speybroeck of Scott Community College, Henry Tropp of Humboldt State University, Bernard Cohen of Harvard University, Herbert Fockler of Georgetown University, J.B. Harvill of Texas Christian University and Nancy Stern of Hofstra University.

In addition to Sammet, who works for IBM's Federal Systems Division in Cambridge, Mass., the committee members include Isaac L. Auerbach of Auerbach Publishers, Inc., Joe Ann Clifton of Litton Industries, William P. LaPlant Jr. of the U.S. Air Force Data Services Center, Erwin Tomash of Dataproducts Corp. and Cuthbert C. Hurd, energy consultant.

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'Turtle' Creates Unique Artwork

(Continued from Page 25)

tem at the exhibit.

During the exhibitions and to the amazement of groups of watching school children, the turtle drew forms covering a 16-foot sheet of paper. Although the actual CPU time needed to generate a picture is only 12 minutes, the turtle is slower and needs approximately two and a half hours to finish a piece. The system is also programmed to perform shading when it wants to, which takes even more time for the turtle to complete.

$1,000 Offer

Since Cohen has room to store only a few of the large drawings, he gave them to the group of children. An adult visitor offered $1,000 for one piece of artwork. That is the most money Cohen has received for any of his works.

Cohen and his computer system have turned out several hundred thousand drawings, each different from the one before.

"Most people can't believe the pictures are done by a machine. They believe they've been made up in advance and put into the computer, but it's all up to the computer what comes out," Cohen said.

It's very appealing to the average person, but its impact is measurable by where the most publicity about the artwork appears, he said. About 400 column inches have appeared in newspapers — but none in any part of the art magazines, he noted.

ABA Studying ATM Security

WASHINGTON, D.C. — The Payments System Planning Division of the American Bankers Association (ABA) is conducting a survey of 250 banks to determine the effectiveness and scope of security for one of the most used electronic fund transfer services — automated teller machines (ATM).

Questions cover general security measures, loss experience, customer liability and overall security effectiveness.

The results of the survey are expected to be released later this summer.

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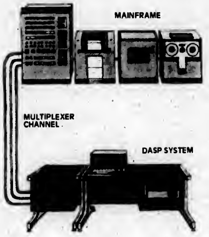

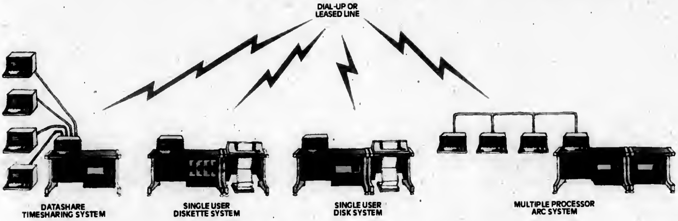
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Bowling Center Scores With Small System

CEDAR RAPIDS, Iowa — Members of the "Wednesday Wonders" women's bowling league gather at the Cedar Rapids Bowling Center every week. And after each of the eight teams has bowled a three-game set, the league secretary collects the score sheets and sits down at a computer to update the records.

A computer in a bowling alley? Used by people who may never have seen a computer, much less operated one?

More than 70 league secretaries use this IBM 5100 to record scores, averages and high and low games. Although most had no experience, they became computer operators in a matter of hours.

"Why not?" asked Steve Benz, the progressive proprietor of the 32-lane bowling center.

"League competition for both individuals and teams requires a lot of recordkeeping, which falls on the shoulders of the league secretaries. The secretaries used to spend several painful hours after each weekly session, recording individual and team scores and team wins and losses, figuring averages, pinpointing high games and high series and sorting out the league standings.

"Now they get all that work completed in about 15 minutes, thanks to our computer. It's so simple to operate, that with a few hours training, anyone can use it," Benz said.

The secretaries seem to agree. All of the more than 70 league secretaries at the Cedar Rapids center have abandoned the paper-and-pencil routine in favor of the computer — an IBM 5100.

Benz feels that simplicity is the key to the computer's acceptance by the secretaries. The computer guides the secretary step-by-step through the procedures for recording scores, with messages displayed on a small CRT screen.

It displays team and individual bowler names in sequence, and asks for the game scores. The computer can handle irregularities like makeup games, substitute bowlers and handicap changes.

After the scores have been entered, the 5100 displays a full record of league name, team name bowlers, game scores and total pins. A secretary can get a printout of that day's record or can ask for a printout of the year's cumulative statistics.

Good for Business

Benz thinks the computer is good for business. "League bowling accounts for more than 80% of our business and draws some 5,000 team bowlers to the center each year," he pointed out. "But because of all the work involved, the leagues were having trouble finding secretaries. That's no longer a problem here.

"And," Benz continued, "the computer has proven to be a powerful promotional tool.

"After all, it's pretty unusual to see a computer in a bowling center."

'Can't We Do Something About Response Time?'

The Association For Systems Management Presents the 11th Annual Atlantic Systems Conference, September 25-26, 1978 at Doral Inn, Lexington & 49th St. N.Y., N.Y. Costs: $115. ASM Member, $130 Non-member. Contact: Ms. Sandra Paul, (212) 572-2266 or write: ASM, 1 E. 42nd St., Rm. 805, N.Y., N.Y. 10017.

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The 820 comes with standard equipment that's setting new industry standards. So, join us for a short demonstration and we'll show you what we mean.

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First of all, you'll note that the new 820 has an efficient, compact design with a keyboard resembling that of a standard typewriter. So, it can sit on a desk top or stand. And it's easy to use. In operation, you'll see one of the first features: a 9 x 7 dot matrix printhead that prints clear, legible characters. On both the original and up to five copies, too. And a wide carriage that prints forms from 3 to 15 inches in width — up to 132 characters across — at 150-cps speed.

Now, notice the 640-character FIFO buffer. It channels data so

Ford Fiestas in Final Assembly in Dagenham, England

Net Tracks Orders For Ford of Europe

LONDON — Making sure its customers receive the exact type of car they ordered is no small task for the people at Ford of Europe.

The size of the job can be measured by the fact that last year more than 1.6 million cars and commercial vehicles were produced at Ford's European plants. The task also involved coordinating orders within a very large complex of 15 marketing organizations in as many countries and 18 manufacturing plants in Belgium, France, Spain, the UK and West Germany.

A large part of the job of tracking the order from the time the customer signs an agreement in the dealer's office to final delivery of the vehicle falls on Univac 90/30s.

Currently a total of 14 such systems, valued at more than $4 million, are in use at Ford facilities in 12 European countries.

Standardized Orders

Ford of Europe uses a standardized vehicle ordering system. When a customer places an order in a particular country, it is keypunched and then entered into the system through the local 90/30.

The order information includes many variables — engine size, transmission type, exterior and interior colors, wheel type, tire type and optional equipment such as radio, stereo tape and trim options.

The local 90/30 is linked via data communications lines to Ford of Europe's headquarters at Worley near London, where production and assembly locations are assigned for the car on order according to factory schedules.

When the vehicle leaves the factory, the same data link advises the local marketing organization through its 90/30. The vehicle is then shipped to the customer's dealer and an invoice prepared on the computer.

Data storage files of the local 90/30 contain a complete record of the car from the initial order to the end of all warranty obligations.

In addition to the vehicle ordering role, the 90/30s supervise parts control and handle the ordering, shipping and invoicing of dealers and garages for parts. Orders for parts received by wholesale dealers are processed by the systems.

The 90/30s also perform such local applications as production assembly of parts kits, payroll and general accounting.

Currently, systems are installed at the Worley, England, headquarters; in Cork, Eire; in France — one at Ford France headquarters at Ruiel, Paris, and another at the parts distribution center at Estree St. Denis near Paris; in Rome, Italy; in Zurich, Switzerland; in Salzburg, Austria; in Antwerp, Belgium; in Amsterdam, Holland; in Oslo, Norway — one at a tractor plant and the other at a parts center; in Stockholm, Sweden; in Copenhagen, Denmark; and in Helsinki, Finland.

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Breaking the Language Barrier

Part II

By Tom DeMarco

IN DEPTH
IN DEPTH
IN DEPTH

I trace the term "structured English" back to a landmark paper called "PDL — A Tool for Software Design" by Stephen H. Caine and Kent E. Gordon that was published in the 1975 *National Computer Conference Proceedings*. To be honest, Caine and Gordon were not talking about exactly what analysts have come to call structured English, but about something we now refer to as pseudocode.

The structured English I advocate here would not be a good tool for software design, since the requirements of design impose too much formalism and "codesyness" for an analysis-level tool. Still, I think the Caine-Gordon paper is extremely relevant to the subject of linguistic specification; I urge you to read it.

On the chance you may not rush off and read the PDL paper in spite of my urging (there is just no respect for authority anymore), I reproduce here part of its definition of PDL:

> **It is a *pidgin* language in that it uses the vocabulary of one language (i.e., English) and the overall syntax of another (i.e., a structured programming language.**

That statement could very appropriately be applied to structured English.

In composing our structured subset of the English language, we will do some extensive trimming of the vocabulary. But the most noticeable difference between structured English and normal written English is the one cited in the preceding quote; adaptation of the limited constructs of structured programming in place of the infinitude of ways that unstructured English allows you to formulate logic.

This idea is entirely in keeping with the goal of building an orthogonal tool. The developers of structured programming were faced with the exact same task in their work: to trim programming languages by discarding overlapping facilities. The result of their effort is a highly orthogonal set of constructs, readily applicable to our requirement.

Structured English is plain vanilla English minus some of the more elaborate facilities of the language. Specifically excluded from our subset are the very features that tend to get analysts into the most trouble while writing specifications:

1. Wishy-washy qualifiers (adjectives and adverbs).
2. Compound sentence structures.
3. All modes but imperative. (Take heart, friends. This means you will have to write specifications without using the subjunctive. Had you but known!)
4. All but a limited set of conditional and logic statements.
5. Most punctuation (semicolons, dashes, exclamation points, question markes, elipses and the like).
6. Out-of-line description, specifically footnotes.

All of this is negative — it says what structured English is not. Structured English is a specification language that makes use of a limited vocabulary and a limited syntax. The vocabulary of structured English consists only of:

- Imperative English language verbs.
- Terms defined in the Data Dictionary.
- Certain reserved words for logic formulation.

The syntax of a structured English statement is limited to these possibilities:

1. Simple declarative sentence.
2. Closed-end decision construct.
3. Closed-end repetition construct.
4. Combinations of the above.

I suspect that may seem a bit obscure to you. Let's look at some examples before we go on.

An Example

Consider, as our first example, Figure 1A and 1B. I shall restrict my comments to the form of the example (if its content needs explaining, the case for structured English is lost).

The vocabulary I have used in my structured English is, for the most part, made up of verbs and terms defined in the Data Dictionary (the hyphenated names), together with some obvious reserved words and phrases like "For each" and "equal to" and "If . . . Otherwise." I have not absolutely

```
                    Policy for Ordering New Stock

For each New-Stock-Request, do the following things:
   1.   Search for an Authorization-Form with Reference-Number
        equal to the Request-Number on the New-Stock-Request.
   2.   If there is no match, discard this New-Stock-Request.
        Otherwise:
             Write a Purchase-Order for the Ordered-Item.
             From the Supplier-Catalogue, select a Supplier
                that carries the Ordered-Item.
             Copy Supplier-Name-and-Address on to
                Purchase-Order.
             Copy Purchase-Order-Number on to
                New-Stock-Request.
             File New-Stock-Request with Authorization-Form.
```

Figure 1A

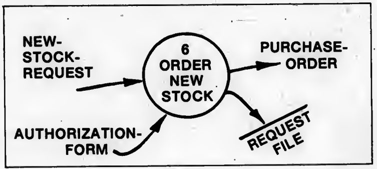


Figure 1B

```
                    Policy for Ordering New Stock

FOR EACH New-Stock-Request:
   1  Find Authorization-Form SUCH THAT Reference-Number
      EQUAL TO Request-Number OF New-Stock-Request.
   2.  IF NO MATCH, discard New-Stock-Request.
       OTHERWISE:
         Write Purchase-Order FOR Ordered-Item.
         Select Supplier FOR WHICH Ordered-Item
               appears IN Supplier-Catalogue-Entry.
             Copy Supplier-Name-and-Address ONTO
                  Purchase-Order.
Copy Purchase-Order-Number ONTO
     New-Stock-Request.
File New-Stock-Request WITH Authorization-Form.
```

Figure 1C

The real problem in most system development efforts may be that English is too open to personal interpretation to be appropriate in the structured world of DP.

In this three-part series, excerpted from Structured Analysis and System Specification, *Tom DeMarco shows how to impose limits on our native language so analysts, designers, programmers and users can safely use it to define what they are trying to develop. This week, in the second part of the series, he shows that using structured English need not be a traumatic experience.*

IN DEPTH
IN DEPTH
IN DEPTH

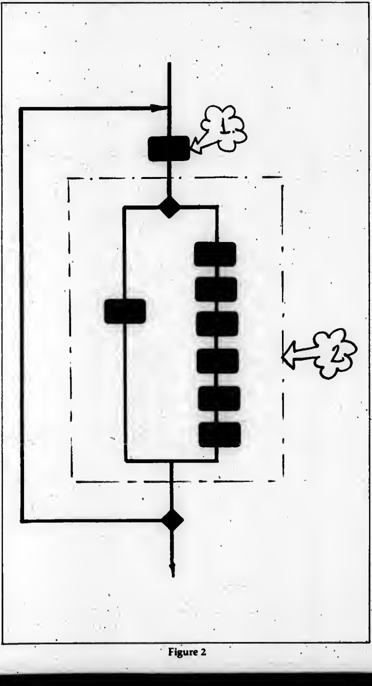


Figure 2

denied myself the luxury of an occasional adjective or good old wishy-washy noun — the phrase "following things" in the first statement is a prime departure from the standard — but I easily could have.

When I write structured English, I do it as a two-step process. First, I write the whole policy, adhering rigorously to the standard vocabulary. Then I go over it again and add some exceptions to improve the appearance. After all, we have to sell this to the user.

To see my interim product, go back to the example and cross out every word that is not part of the permitted vocabulary of structured English. You should end up with something like Figure 1C. (I have capitalized the likely reserved words and phrases in this example to call attention to them.)

The result, as you can see, is still precise and comprehensible. But it looks too stilted for our purposes; it looks far too much like code. A little editing makes it a lot more palatable.

I hope you will take a nonreligious approach to structured English and allow yourself to deviate from the standard vocabulary when a clear improvement in readability results. We require this much flexibility in our specification language to make it workable for all cases and to allow us to tailor it for user acceptability.

What About Structure?

So far, I have only commented on the vocabulary used in the example. How about its structure? Does it conform to the limited set of logical constructs allocated to us?

In order to determine this, I have drawn a tracing of your stream of consciousness as you read the policy (see Figure 2.) This diagram portrays the logical structure of the structured English description. In order to make it look as familiar as possible, I have used a flowcharting convention to present it.

As shown in Figure 2, the overall structure of the sample policy is a closed-end loop. Contained within this loop are a number of imperative statements, and one of these (No. 2) is a closed-end decision structure with a number of imperative statements nested inside it.

Since each portion of the structure is either a simple imperative statement, a closed-end loop, a closed-end decision or some combination thereof, the structure does fall within the standard.

If the last demonstration seemed to involve a certain amount of handwaving, I sympathize. A more methodical approach to verifying the structure of a description will be presented later.

Logical Constructs

The logical constructs of structured English are shown in Figure 3. These three basic building blocks for policy description are defined as follows:

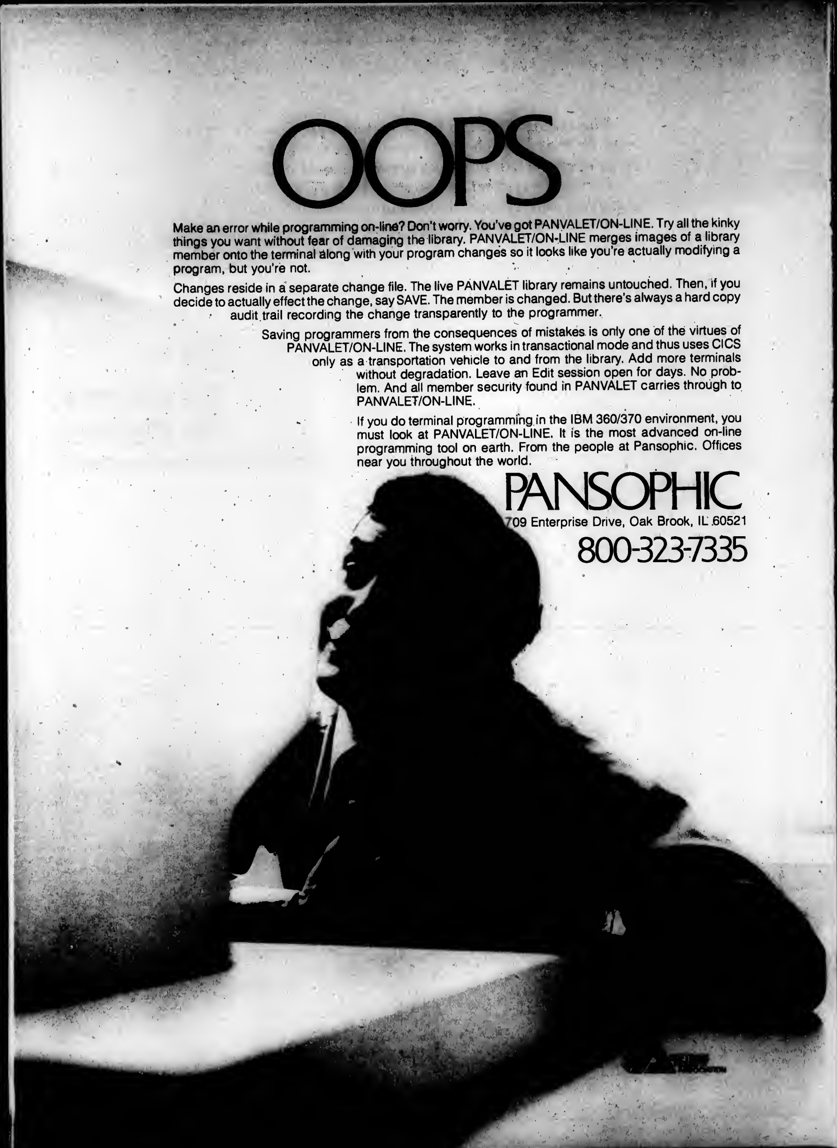
- *The Sequence construct*, consisting of one or more subordinate policies (pieces of the overall policy) which are to be applied one after the other without interruption.
- *The Repetition construct*, a subordinate policy that is done over and over again within some limit.
- *The Decision construct*, consisting of two or more subordinate policies, only one of which applies in any given case.

The three constructs have this characteristic in common: Each has a single starting point and a single ending point. This means any policy whose syntax conforms to one of the building-block structures will be readable in a simple top-to-bottom fashion, without interruption of the serial thought process. This will also apply to policies that are composed of combinations of the building blocks.

The advantage of policies described in this way is that they are easier to read and understand. The center of the brain that is responsible for reading is a serial processor; a description that tries to introduce interruptions in the serial flow of consciousness is difficult to read. (It would be easier to describe such policies with flowcharts. That's why flowcharts were invented.)

Policies that lend themselves well to smooth sequential reading are easier to understand. They are not continually fighting against the medium chosen for their representation. I offer no

(Continued on Page 33)



OOPS

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(Continued from Page 31)

proof that descriptions written explicitly for serial consumption are easier to read, but I hope to convince you of that idea.

The limited syntax provision I have imposed upon you means that any properly written structured English policy description must be *structurally* equivalent to some combination of the three basic building blocks shown in Figure 3.

But what is the structure of a given description, and how do we determine it? What are we to do about it if it turns out to be different from what we would like to see?

Structure of a Description

The structure of a policy description is represented by a flowgraph which traces the reader's stream of consciousness as he considers the policy. I am not advocating that you flowchart your policy; that would be unacceptable to most users and a waste of time.

However, just to become familiar with the rather unusual idea of working with a severely limited syntax, I propose that we look at some policies together with their flowgraph structures. You will very quickly dispense with any further need for these graphs as you develop a feel for which policies fit the limited syntax and which do not.

Our first example is taken from the study of a securities exchange. Its associated flowgraph is presented in Figure 4A.

Order Matching Policy Description One

My work Involves procassing buy and sell tickets contained in two large filas (the Buy Book and the Sell Book) against each other and looking for matchas.

It proceeds like this: first thing each morning. I incorporate any buy ordars that may hava arrived into tha Buy Book. Each buy order tickat gats tha following treatment. (1) I tima stamp it (2) I tear off tha carbon and pass that to tha archivist; (3) I placa tha tickat in the Buy Book in position by security name, bid price and time.

Now I go through the Sall Book, starting with tha oldast sall ordar, and chack aach one against tha Buy Book for a match. I considar it a match if thase thrae conditions are fulfilled: same security, sama quantity and bid price within one-aighth of a point of askad price. On a match, I taka tha two tickats out of tha books and staple them togethar; thay now constitute a trade. I give tha trade to tha data entry clerk.

Does the structure shown in Figure 4A conform to the limited syntax of structured English? Yes. The entire policy is single-entry, single-exit, so it can be viewed as a single Sequence construct. Nested within it are two Repetition constructs (marked A and B in the figure).

The first of these (A) has two subordinate Sequences (C and D). The second (B) has a subordinate Decision (E) which itself contains a subordinate Seuqence (F). The entire policy and each component of it can be represented in terms of the three building-block constructs.

Since the policy as described by the user already conforms to the restricted syntax, no structural revision will be required to express it in structured English. All we have to do is trim the vocabulary, incorporate Data Dictionary names, and perhaps indent to emphasize subordination (see Figure 4B).

Before I try to set down procedures for working with description structures, I would like you to look at one more example. This one also involves security order matching.

Order Matching Policy Description Two

I start with the oldest sell tickat in my Sell Book and than procaed through all the rest in tha sama fashion: First, I saarch tha Buy Book for a match (same security and bid and asked price within 1/8 of a point).

If I don't get one, I go back and try tha next sell ticket, and so on. If there is a match on sacurity and price, I look at the quantity.

When tha quantities ara equal, it's easy — I just taka out

(Continued on Page 35)

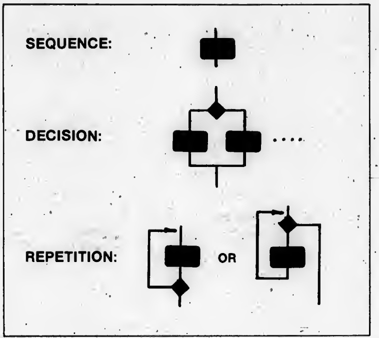

Figure 3

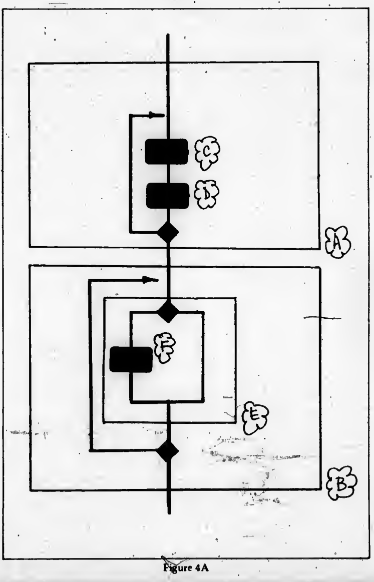

Figure 4A

```
Order Matching Policy One

For each Buy-Order in Accumulated-Orders-Stack:
        Add Time-of-Day.
        Separate Order-Carbon-Copy.
        Enter into Buy-Book by Security-Name, Bid-Price,
        and Time-of-Day.
For each Sell-Order in Sell-Book:
        Find first Buy-Order with matching Security-Name.
        If found.
            If Qty-Bid equals Qty-Asked and Price Bid
            is within 1/8 point of Price-Asked
                        Combine Buy-Order and Sell-Order into Trade.
```

Figure 4B

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EASY
to interface
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to maintain
EASY
to operate
EASY
to buy!

features

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Video Attributes
Line Drawing
128 ASCII Character Set
14 Key Numeric Pad
Time of Day Clock

Beehive International's Micro Bee 1 is an 8085A microprocessor controlled terminal offering numerous user oriented features, such as self-diagnostics, which ensures at a glance that the terminal is operating correctly. The status line is used extensively by the Micro Bee 1 system firmware to display modes of operation, error messages, communication protocol data as well as a status message showing optional switch configurations.

Among the Micro Bee 1 features is the ability to evoke the memory lock condition that allows the operator or host computer to lock a portion of the display memory while retaining the capability to enter or receive data in the unlocked portion of the display memory. Sixteen non-displayable character cells are available on each line for establishing character and field attributes. Other visual features include normal, reverse, blink, underline and half intensity video levels. The line drawing graphics capability allows for the creation of forms on the display using the vertical and horizontal line feature.

The expanded characteristics of the Micro Bee 1 include X-Y addressing, read cursor address, invisible memory address pointer, 128 ASCII characters set with descenders, 25 x 80 line format, and read terminal status.

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- *20 milliamp current loop*
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Phone 020-451522 • Telex 15284

(Continued from Page 33)

the two tickets and use them to write up the trade. Then I go back to my Sell Book and do the next one in the same way.

When the quantities are different, what I do depends on which is greater.

When the sell quantity is greater than the buy quantity, I rewrite the sell ticket as two tickets: one for the same quantity as in the buy order (I treat this new sell and the matching buy as a trade and proceed with it exactly as above), the second for the residual quantity.

As soon as the trade for the matched pair is complete, I try to match the residual sell instead of taking the next sell ticket from the book. The matching process works the same as above aside from that difference. I may even break up the ticket further.

When the sell quantity is less than the buy quantity, I can't break up the buy the way I did with the sell. So I take the two tickets out of the book and pass them on to the floor trader, who treats them as a negotiated order.

The flowgraph for this description is shown in Figure 5A. Does the structure of the description conform? No, there is no way to represent the flowgraph of Figure 5A in terms of the basic building blocks. There are some rather different constructs used in this description, and they are not such handy ones. They don't all have the single-entry, single-exit characteristic.

In order to come up with a structured English description of this policy, we have to do some restructuring. A restrucured version of the same underlying policy might be Figure 5B.

The revised description does conform to the restricted syntax (see Figure 6). Note that it is not the underlying policy which has changed, only our description of it.

Easy Algorithm for Testing Syntax

If you are or have been a programmer, it will not be difficult for you to look at a flowgraph depicting the structure of a given description and tell at a glance whether or not its syntax conforms. Chances are you will attack it in the same "outside-in" fashion that I used to analyze Figure 4; i.e., you check that the overall policy at the highest level can be viewed as one or more of the basic constructs. This helps you to isolate the subordinant policies.

Then you look inside each of them and see whether they are made up of legal constructs of their subordinates, and so on. If any test fails, the syntax does not conform.

If the graph is complicated, you may have trouble with hte outside-in approach. Figure 7A shows an alternative method (an inside-out method) that is a straightforward and foolproof test.

Figure 7B presents these replace-

(Continued on Page 39)

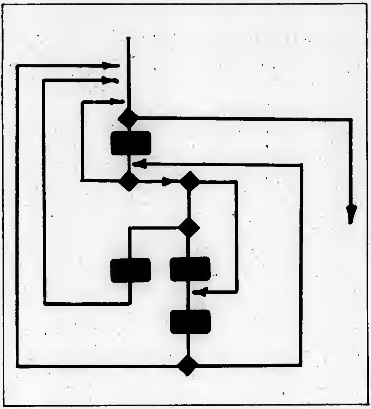

Figure 5A

```
Order Matching Policy Two

Take Sell-Tickets in order from the Sell-Book.
For each Sell-Ticket:
  Search Buy-Book for match on Security-Name and Asked-Price within
  1/8 point of Bid-Price.
  If found,
    Compare Qty-Asked to Qty-Bid:
    Case 1 (Equal):
      Combine Tickets.
      Write up Trade.
    Case 2 (Qty-Asked less than Qty-Bid):
      Write Partial-Sale:
        Copy Security-Name from Sell-Ticket.
        Copy Qty-Bid from Qty-Asked on Buy-Ticket.
        Copy Seller-ID from Sell-Ticket.
      Write Residual-Sale:
        Copy Security-Name from Sell-Ticket.
        Copy Seller-ID from Sell-Ticket.
        Set Qty-Bid to difference between Qty-Bid
            on Sell-Ticket and Qty-Asked
            on Buy-Ticket.
      Discard Sell-Ticket.
      Place Residual-Sale in Sell-Book to
          be taken as next Sell-Ticket.
      Combine Partial-Sale and Buy-Ticket.
      Write up Trade.
    Case 3 (Qty-Asked more than Qty-Bid):
      Combine Tickets.
      Write up Negotiated-Order.
```

Figure 5B

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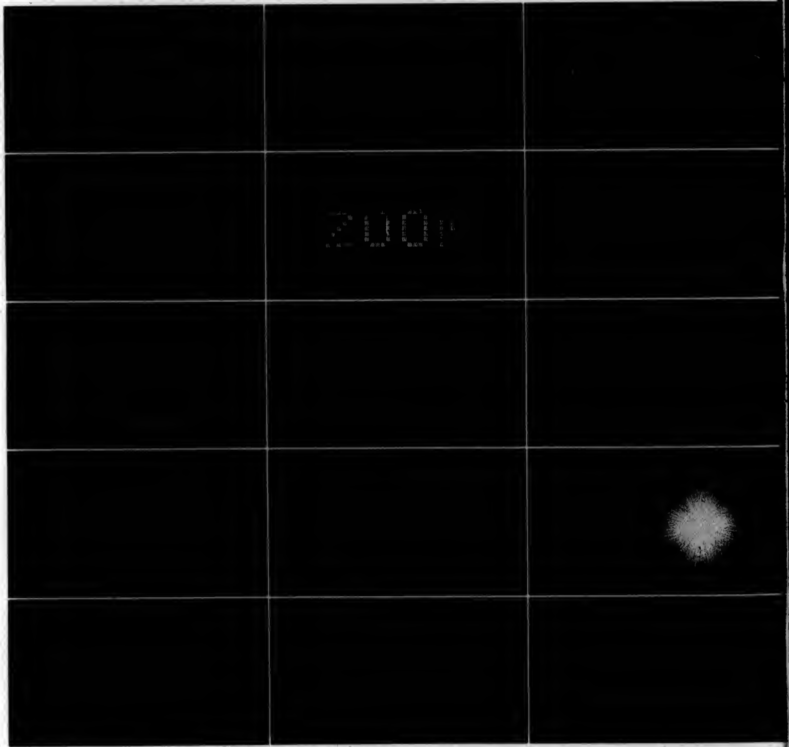
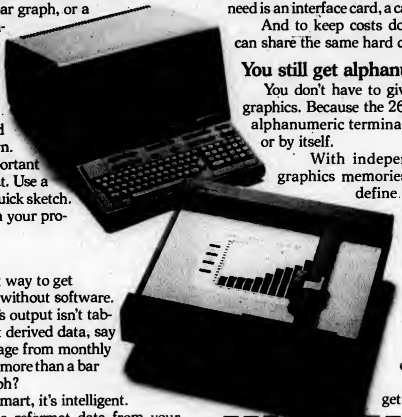


graphics software.

You just lost your last excuse for sticking with alphanumerics. Because with HP's new 2647A Intelligent Graphics Terminal, you get graphics without digging into your CPU's software.



A picture's worth a thousand numbers.

On an alphanumeric terminal, your data's just a screen full of numbers. But with the 2647A you can plot tabular data as a bar graph, or a pie chart, or a linear or logarithmic line graph. Quickly, with just a few keystrokes.

Now you can really see your data, not just look at it.

What's more, with the 2647A you can zoom in and out. Pan right, left, up, down. Selectively erase. Shade important areas to make them stand out. Use a rubber-band line to make a quick sketch.

Without any help from your programming department.

It's more than smart.

The 2647A's the smart way to get graphics from tabular data without software.

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You can program it to reformat data from your CPU, or to compute more data, in easy-to-write BASIC. And you can program it in AGL, our high-level graphics language extension of BASIC. Its powerful commands, such as FRAME, AXES, LABEL, LOCATE and PLOT, put sophisticated graphics at your fingertips.

Either way, your program runs on the 2647A without any help from your CPU.

Hard copy's easy.

How do you get graphics into your briefcase?

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Three-part stock paper costs about $22.30* per 1000 pages. But you can put the same report on microfiche for around $1.50.

So, from the standpoint of materials alone, paper is about 15 times more expensive than microfilm.

Time and labor costs are important factors, too. Especially in a DP department. Which is why you should know that it would take almost 50 minutes to decollate, burst, bind and package a 1000-page report. It would take only 9 minutes to print, duplicate and package the same report on just 4 microfiche.

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In fact, when you add up the savings in materials and labor, you'll find that printing with a Kodak Komstar laser printer is about 87% cheaper overall than printing with a paper-impact printer.

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Kodak Komstar microimage processors.
The printers that print without paper.

*Prices vary with geographic location and grade of paper purchased.

(Continued from Page 35)

ments in graphic form. Try your hand by applying the test to the two flowgraphs of Figures 4A and 5A. You should be able to demonstrate that the first is legal and the second is not.

As a further reinforcement of this concept, Figure 8 presents a set of flowgraphs that conform to the limitations of structured English, and Figure 9 presents some that do not.

If you find yourself struggling to determine whether the limited syntax of structured English has been observed, you may be working with too large a primitive. Consider breaking it down further.

```
Syntax Checking Algorithm

1.  Draw a flowgraph for the description.
2.  Repeat the following replacement process until no further
    replacements are possible.
            2.1  If there is a complete Decision construct,
                     Replace it with a Sequence construct.
2.2  If there is a complete Repetition construct,
        Replace it with a Sequence construct.
2.  If there are two adjacent Sequence constructs,
       Replace them with a single Sequence construct.
3.  If the entire flowgraph has now been replaced with a
    single Sequence construct,
The description does conform to the limited syntax.
```

Figure 7A

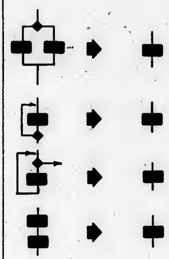

Figure 7B

English Building Blocks

This section will show you some examples of structured English policy segments that conform to each of the building-block constructs. Each example constitutes a "linguistic implementation" of one of the simple syntactic elements shown in Figure 3. As we go along, the rules governing these linguistic implementations will become evident.

The first example, Figure 10, is a Sequence construct. You might consider this example to be five Sequence constructs, or you might think of it as a single Sequence construct with five subordinate Sequences on the inside.

In this last case, you have an opportunity to introduce added clarity by using one statement to declare the whole and presenting the subordinates that make up that whole in some way that calls attention to their subordinate role (see Figure 11).

I'm sure you can see the pattern in these Sequence constructs. Abstraction of this pattern gives us our first rule:

RULE ONE: A Sequence construct is composed of one or more simple imperative sentences.

A simple imperative sentence consists of a single transitive verb (i.e., one that takes a direct object) in imperative mode (as though giving an order) together with direct and indirect object(s). Whenever you use a simple imperative statement or a set of them, you are guaranteed to be conforming to the syntax limitations of structured English. Most structured English is made up of simple imperatives.

Figure 12 is an example of a Decision construct. Some analysts would write this in a slightly different format, as in Figure 13, which calls your attention

(Continued on Page 41)

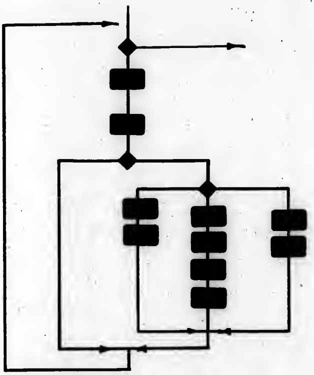

Figure 6

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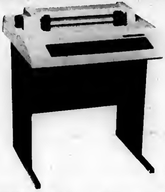

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(Continued from Page 39)

to the idea that there is one construct here, not two.

Frequently, one of the legs of the Decision construct involves no action; that is still legally within the syntax of the Decision construct. It would be written as in Figure 14.

From this and the previous examples, you have probably already deduced the following:

> **RULE TWO: A Decision construct may be implemented by a conditional statement (typically something like "If such-and-such is true"), followed by a subordinate policy which applies if the condition is met and another which applies if it is not. The second of these — the "otherwise" policy — may be omitted.**

Most analysts use the If-Then-Otherwise format to build their Decision blocks. The If-Then-Otherwise works as in Figure 15.

Any description you write using the If-Then-Otherwise format is bound to conform to the syntax limitations of structured English, provided that you have no violations in any of the subordinate policies. Of course, you may use some different phraseology to express the same logic.

A word about conditions: You will often want to use some compound conditions (If this and that and theotherthing) to distinguish among your subordinate policies. This is perfectly all right providing you don't get carried away.

Readability the Key

Readability is the key. If the compound condition would be comprehensible in spoken English, then it is acceptable; otherwise, you would be better advised to express part of the condition with a subordinate Decision construct.

In any event, never allow yourself to use compounds that are combined with both an "and" and an "or" (If this and that or theother) since they make no sense.

Also, be careful that the end of your Otherwise-policy is clearly distinguished from the next construct. You can take care of this with your indentation convention if you apply it rigor-

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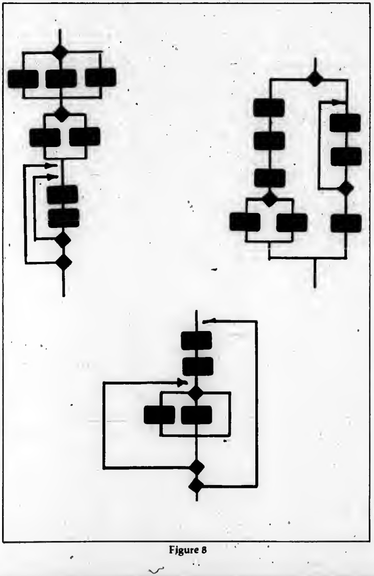


Figure 8

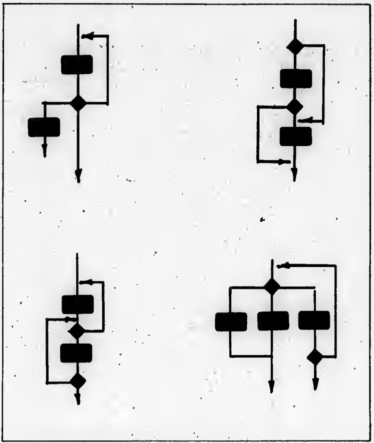


Figure 9

Policy for Writing Up Sales

```
Access Price-File by Part-Number from the Incoming-Order.
Copy Unit-Price from Price-File-Record into Unit-Price
    of Sales-Form.
Set Subtotal to product of Unit-Price and Quantity-Ordered.
Set Sales-Tax to 3% of Sub-Total.
Set Total to Sub-Total plus Sales-Tax.
```

Figure 10

Policy for Writing Up Sales

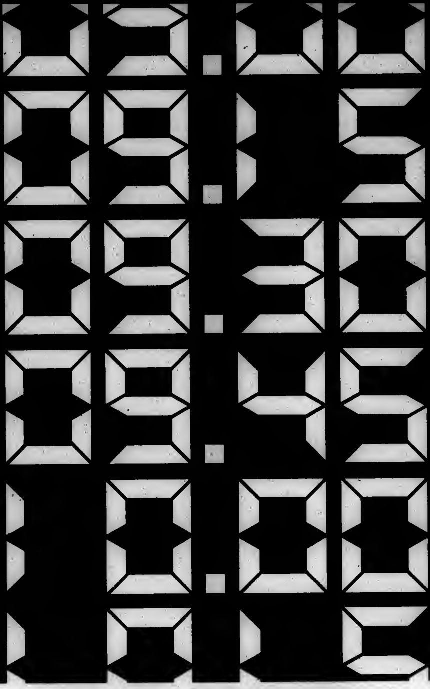
```
Use Incoming-Order to prepare Sales-Form:
    Access Price-File by Part-Number from the Incoming-Order.
    Copy Unit-Price from Price-File-Record into Unit-Price
        of Sales-Form.
    Set Subtotal to product of Unit-Price and Quantity-Ordered.
    Set Sales-Tax to 3% of Sub-Total.
    Set Total to Sub-Total plus Sales-Tax.
```

Figure 11

Depreciation Policy

```
If the Current-Capital-Value is less than $1000,
    Set Depreciated-Amount to Current-Capital-Value.
    Set Current-Capital-Value to zero.
Otherwise,
    Set Depreciated-Amount to 10% of Current-Capital-Value.
    Reduce Current-Capital-Value by 10%.
```

Figure 12



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IN DEPTH

(Continued from Page 41)

ously.

You can get into trouble with Decision constructs that are spread across the page boundary; in that situation, the reader will lose track of indentation. Some people like to add an end market to the If-Then-Otherwise format in order to take care of this problem, as in Figure 16.

Suppose you have a policy that has more than two alternative subordinate policies, only one of which applies. The If-Then-Otherwise format only allows for a two-way Decision construct. Of course, you could use subordinate Decisions to take care of further subdivisions, but that might be artificial, particularly when the situation cries out to be treated with a certain amount of parallelism. A better approach would be something like Figure 17.

The word "case" in English means precisely what we mean to imply here, i.e., the existence of n possibilities, only one of which is applicable. Just as in our normal use of the word in spoken communication, this use of it is single-carry, single-exit.

The reader understands instinctively that once he has applied the one case that is relevant, the next portion of the policy is taken from whatever follows the set of cases.

The format used in the preceding example might be called the Select-Case format. In the abstract, it looks like Figure 18. This gives us a second implementation of the Decision construct. The rule for it is as follows:

(Continued on Page 47)

```
                    Depreciation Policy

If the Current-Capital-Value is less than $1000,
    Then,
        Set Depreciated-Amount to Current-Capital-Value.
        Set Current-Capital-Value to zero.
    Otherwise,
        Set Depreciated-Amount to 10% of Current-Capital-Value.
        Reduce Current-Capital-Value by 10%.
```

Figure 13

```
              Young Driver Surcharge Policy

If Policy-Holder-Age is less than 25,
    Add 12% to Amount-of-Policy.
    Add Insulting-Disclaimer to Notes-Section.
```

Figure 14

```
                If-Then-Otherwise Format

If  < fill in your condition here >  .
        Then,
            < fill in your "then" policy here >  .
        Otherwise,
            < fill in your "otherwise" policy here >  .
```

Figure 15

```
                If-Then-Otherwise-Format

If  < condition >  .
        Then,
            < then-policy >  .

            Otherwise,
                < otherwise-policy >  .
In any case,
```

Figure 16

```
            Policy Governing Mode of Shipment

Select the policy which applies:
    Case 1 (Cost-of-Order)  > $100):
        Send via Air-Freight-Prepaid.
    Case 2 (Cost-of-Order in range $10 to $100):
        Send via Parcel-Post-Prepaid.
    Case 3 (Cost-of-Order  < $10):
        Send via Parcel-Post-Collect.
```

Figure 17

```
                    Select-Case Format

Select the policy which applies:
    Case 1( <  put condition that defines Case 1 here  > ):
          <  put policy which applies for Case 1 here  > .
    •
    •
    •
    Case n ( <  put condition that defines Case n here  > ):
           <  put policy that applies for Case n here  > ).
```

Figure 18

```
                    Daily Ledger Policy

For each Passenger-Record in the Reservation-File:
    Accumulate Amount-Due into the Running-Total.
    Build a New-Debit-Record.
    Write the New-Debit-Record to the Daily-Ledger.
```

Figure 19

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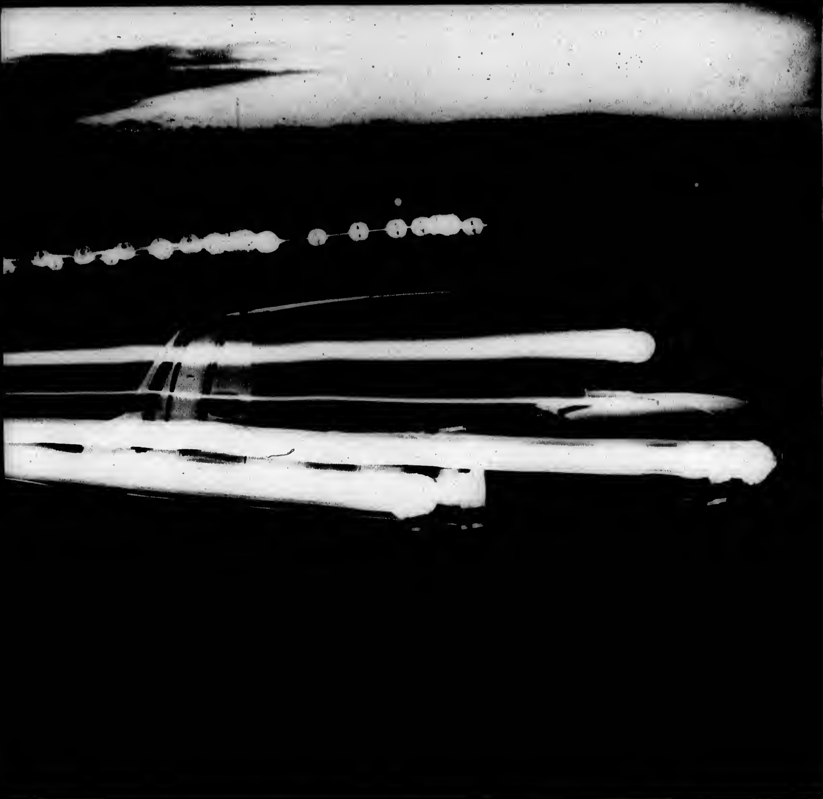

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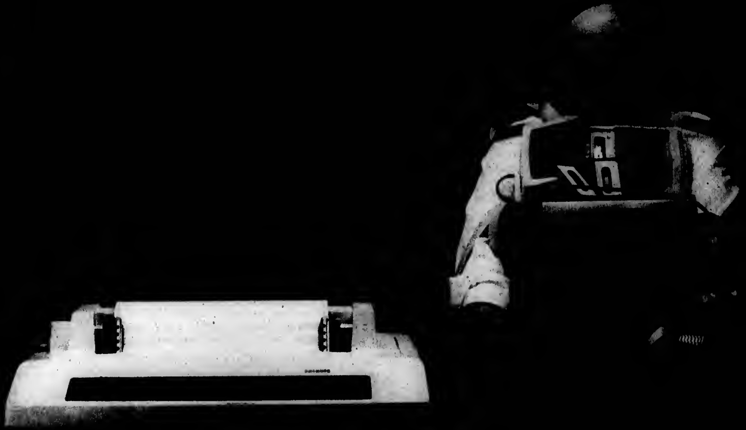

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(Continued from Page 43)

RULE THREE: A Decision construct may be implemented using the Select-Case format or its equivalent.

Any policy described using the Select-Case format or something equivalent to it is guaranteed to conform to the syntax limitations of structured English, provided that the subordinate policies (under the cases) also conform.

It only takes one more example to round out our set. This — Figure 19 — is an implementation of the Repetition construct.

Depending on the situation and your personal preference, you might choose to describe conditions that govern continued repetition in different ways. For instance, many analysts use catch-phrases like "As long as there are any remaining whatevers, continue doing the following" or "Do the following once for each whatever" or some equivalent.

Regardless of phraseology, they all more or less fit into what I call the Continue format, as illustrated in Figure 20.

Some people like to put the condition for continued repetition at the end, as in Figure 21; I still consider this to be in the Continue format. An example is shown in Figure 22.

The rule which summarizes this is the following:

RULE FOUR: The Repetition construct can be implemented with a condition that governs continued repetition followed by the subordinate policy to be repeated.

Any description which adheres to this rule — for instance, one which makes use of the Continue format or its equivalent — is guaranteed to conform to Structured English syntax restrictions, provided that any subordinate policies apply.

All of these examples have each used only one building block. Obviously, structured English policies need not be limited in this respect. It is perfectly reasonable to have a single policy that makes use of more than one of the building blocks, perhaps all of them. Such a policy would be constructed of concentrated and nested subordinate policies, as Figure 23 shows.

A final rule which applies to formulation of structured English policy descriptions is this:

RULE FIVE: A description which combines syntactically valid subordinate policies is itself syntactically valid as long as the subordinates are related by one or more of the building-block constructs.

```
                    Continue Format

<catchphrase and condition for continued repetition here>
             <repeated subordinate policy here>
```

Figure 20

```
                    Continue Format

<catchphrase>  :
     <repeated subordinate policy>
<condition for continued repetition>
```

Figure 21

```
                 Priority Message Policy

Repeat the following:
   Take the next Priority-Message from the Message-Stack.
   Write Message-Text to Message-Log.
   Write Message-Header and Log-Number to Priority-Queue.
Until there are no more Priority-Messages.
```

Figure 22

```
             Bounced Check Retribution Policy

Select the case which applies:
   Case 1 (No Bounced-Checks in Customer-Record):
           Write Exemplary-Customer-Citation to Annual-Summary.
   Case 2 (One Bounced-Check):
           If Yearly-Average-Balance exceeds $1,000,
              Remove Bounced-Check from Customer-Record.
   Otherwise,
   Reduce Credit-Limit by 10%
   Case 3 (Multiple Bounced-Checks):
           For each Bounced-Check
                   Reduce Credit-Limit by 15%.
   Set Credit-Rating to Deadbeat.
   Write Scathing-Comment to Annual-Summary.
   Write Customer-Name-and-Address to IRS-Enemies-List.
```

Figure 23

Tom DeMarco is a senior staff consultant with Yourdon, Inc. in New York and is the creator of Yourdon's Structured Analysis and System Specification Workshop and Structured Analysis/Design Workshop. He is also author of a forthcoming seven-part series on structured analysis from Deltak, Inc.

Early in his career, DeMarco worked on the ESS-1 project at Bell Telephone Laboratories. Later, under contract to IBM, he served as manager of an early time-sharing experiment on the then-new IBM 360 system.

In subsequent assignments, DeMarco was responsible for implementing several very large distributed processing systems.

DeMarco holds a B.S. in electrical engineering from Cornell University, an M.S. from Columbia and a Diplome from the University of Paris (Sorbonne).

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Editorial

Time for Presidential Push

is military DP too important to be left to the generals (and admirals)?

"To deter war and protect the security of, our country," the U.S. armed forces depend on an enormous investment in computer facilities and resources. Yet the general staffs and admiralty lack the experience necessary to manage this investment well, according to a recent federal DP reorganization project report [CW, Aug. 7].

Consuming about 35% of the total Pentagon DP budget, the U.S. Air Force (USAF) is the armed forces leader in DP technology, the project's National Security Team report said. Yet "only one general [brigadier] in the entire USAF ... has an ADP background and career interest," and "the general consensus among Air Force personnel ... is that there is no discernibla general officer in the Air Force primarily concerned with computer resources."

The report added "the Army does not have the quantity or quality of officers required to adequately staff the program offices charged with development of tactical systems." Moreover, "the lack of an ADP career field has seriously undetermined the ability of the Army to attract and retain younger officers necessary to build an overall competency in ADP."

The admiralty was found to scarcely comprehend that most naval functions depend on DP; and the report said no one in the Navy has overall knowledge of its "computer-related activites and costs" — not even the number of Navy computer installations.

The Navy also lacks a formal DP career path for its officers, the team reported. At the commander level (equivalent to the Army/USAF rank of lieutenant colonel), about 5% of Navy officers "have some ADP special skill." This estimate was held comparable to the Army's situation and better than that of the Air Force.

The "jump to captain" (equivalent to Army/USAF full colonel), "reduces the Navy's percent[age] of ADP-trained officers to 3.1," the report said," compared with the Air Force's 3.6[%] and the Army's 3.7[%]."

Few Navy flag rank officers — that is, admirals — "have any ADP experience," the report continued. "Very few are trained in ADP; these are mostly in the tactical area."

The team also reported that "top military and civilian managers of the Navy and Marine Corps" are not attending the executive-level seminars at the Department of Defense Computer Institute (DODCI).

DODCI is run by the Navy and has a superb reputation, the report noted, adding that the inability of flag officers to attend the seminars may partially explain "their lack of participation in the ADP decision-making process."

While it called the Marine Corps "an outstanding example of a small but well-managed ADP activity," the report said flatly the "Navy ADP organization is not designed for the effective management of computer resources."

The clear duty of the Pentagon's top civilian management is to ensure a steady supply of DP experts to the highest officer grades of the military.

President Carter — a reputed Civil War buff and Naval Academy graduate — should better heed the lessons of American military history.

A former director of the World War II U.S. Strategic Bombing Survey, John Kenneth Galbraith, once remarked that President Roosevelt was moved to establish the survey by an appreciation of "the first principle of modern warfare": the performance claims of air generals have only a marginal basis in reality.

No President can assume that Pentagon top commanders will, without considerable pressure from above, turn around this DP management crisis in the armed forces.

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Data Past

Five Years Ago
Aug. 15, 1973

WASHINGTON, D.C. — Claiming that Massachusetts was "being penalized and being bullied by the federal government," Gov. Francis W. Sargent joined the American Civil Liberties Union in seeking an injunction against the FBI's Computerized Criminal History file until regulations to safeguard its operation were drafted.

— — —

NEW YORK — Fraudulent checks said to be in excess of $1 million were allegedly issued from 1969 through January 1973 by a computer operations manager of Westinghouse Electric Corp.'s Appliance Division. Robert A. Morse, the U.S. attorney for the Eastern District of New York, said Billy Howard Hudgins, described as a computer expert, had been charged with issuing the checks to friends.

Eight Years Ago
Aug. 19, 1970

CORPUS CHRISTI, Texas — DP centers in this wind-ravaged town began digging out after Hurricane Celia took its toll.

— — —

TORONTO — A Cobol compiler that ran under the IBM 360 DOS environment promised users dramatic improvement in compile time and modest improvement in the runtime and core utilization of the object programs. Developed by I.P. Sharp Associates, a software house here, IPS Cobol rented for $950/mo or $10,000/year.

Letters to the Editor

Let Post Office Sink or Swim

Philip S. Nyborg missed an obvious solution to his concern over the extension of the postal monopoly into the area of electronic message systems (EMS) [CW, July 31]. While noting that "it has never been determined that the public interest justifies the postal monopoly competing in EMS," he failed to consider a more basic question: Has it ever been determined that the public interest justifies the postal monopoly?

The Private Express Statutes only came into existence in the 19th century as a direct result of individuals entering into successful competition with the post office. In his book *Uncle Sam the Monopoly Man*, William C. Wooldridge pointed out that "in five years, private competition drove postage down to one eighth of its former maximum and brought the U.S. Post Office within sight of extinction." In more recent times, two organizations, the Brennans of Rochester, N.Y., and the Independent Postal Service of America in Oklahoma City, were both successfully competing on first class mail delivery until forced out of business by U.S Postal Service legal action.

Lysander Spooner, one of the most successful and aggressive 19th century free-market postal service entrepreneurs, pointed out in his treatise "On the Unconstitutionality of the Laws of Congress Prohibiting Private Mails" that the U.S. Constitution only gives Congress permission to set up a post office, such being recognized as necessary for Congress to conduct its own business. However, in contrast to the wording of other sections of the same document, it does not grant a "sole and exclusive power" in this area.

If competition and an unregulated market are healthy for EMS, there is no reason, and certainly no constitutional justification as to why it should be unhealthy for conventional mail. I would therefore submit an alternative to Nyborg's proposed public policy on EMS. That is, we should simply repeal the Private Express Statutes and allow the Post Awful to sink or swim on its own merits.

June R. Genis
Redwood City, Calif.

Amusing? Sickening, Too

The cover photo depicting a bird's nest made out of discarded computer printout [CW, July 31] may have been amusing, but it also underscored the environmental impact we are making in this world. To think that Mother Nature is now resorting to man's litter in order to survive sickens me to no end.

Alex Nesenjuk
Philadelphia, Pa.

Well, It Does Sound Better

We are no different from any other company, I am sure, in that we receive all kinds of employment applications and promotional materials from employment agencies.

However, we recently received a unique notice touting an "experienced computer programmer trainee" for hire.

Thought other *Computerworld* readers might find this amusing, as we did.

Fred H. Taucher
President
Corporate Management, Inc.
Seattle, Wash.

Computerworld welcomes comments from its readers. Preference will be given to typed, double-spaced letters of 150 words or less. Letters should be addressed to: Editor, Computerworld, 797 Washington St., Newton, Mass. 02160.

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COMPUTERWORLD
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The Human Connection

Hobby Vendors: Please Clean Up Your Act

By Jack Stone
Special to CW

The exhibit area at the Arlington, Va., "Amateur Computing 78" show, July 22-3, was, in a word, a gasser.

Certainly, I'd never before seen such hilarious carryings-on at a computer-based festival. The pathetic part of it was that the gala was not intended to be funny: it just seemed that way to me. Here are briefs on a few of the incidents.

First, at the display for the *Kilobaud* publication, there was a good-looking boothperson pushing a no-charge contest to passersby in which the winner had a choice of a free hobby computer or a cruise to the Caribbean. Entrants needed only to provide their name and address to qualify. As I really didn't want a ton of junk sales mail for the rest of my years, I bypassed the excitement.

The person was also hawking "instant software" on tape cassettes, a "steal" for only $7.95 per program. She urged every computer gamesperson to buy "Space Trek I," which outfits one with an on-board computer to warn of approaching danger from the Klingon expeditionary force and of ominously low shield power. For the real afficionado, she pushed "Space Trek II," which supplies one with a new arsenal of advanced technology phasers and photon torpedoes, plus more powerful impulse and warp power boosters for jumping around the quadrants.

Cassettes abounded in a huge bowl on the display table, so I picked up one and asked to buy it, to keep as a souvenir of this wondrous trade happening.

She wrenched the box out of my hand and, with a somewhat supercilious glare, told me in no uncertain terms that show crowds are notorious at stealing display materials and that I would have to order a cassette by filling out a form. As I was absolutely determined they wouldn't get my ID, I changed my mind about the memento and moved along.

Digitized Photos

There was the hotshot "Computer Corner of New Jersey," Huckstering a $5,999 system to generate digitized photographs. The boothniks were inviting show guests to have their faces scanned, digitized, gray-scaled and listed out in a foot-square, grossly defocused pattern for the special show price of only $2.

Quoth the salesman, "Man, this is the greatest! You can take this machine to any carnival, boardwalk, even church fund raisers and charge $6 or $7 per printout. We have developed the heat press technology to the point where we can transfer not just to T-shirts, but to crossword puzzles, dart boards, aprons and calendars! What's more, biorhythms are provided as a no-cost feature!" I walked away, trying to figure out the differences between that machine and a $9.95 Polaroid camera.

Then I spotted my beloved vendor, the Georgetown Computer Emporium, Inc. president and resident maintenance person Lee Bristol, who had sold me my (Interim) word processing system and installed it on my cruiser. We had consummated the deal after he had assured me that, if need be, he would repair the machine in situ (I need only keep him fully supplied with life jackets and survival spirits as he wielded his soldering gun).

Although his sales approach had been a bit shaky in the beginning (or perhaps I had been too intimidating a purchaser), let the record show that the system works well, as specified, and that the emporium seems to be a light in the dark jungle of small machine dealers in metropolitan Washington, D.C.

He was working his booth with his lead computer "groupie," Lewis Bean, when I made the mistake of asking him the fateful question, "What's new?" Bean rushed to demo "Apple-Vision" (ugh!), a 30-second drill in clumsy stick drawings and including wretched low-fidelity Irish jig noises on a trivial loudspeaker.

Then Lee mentioned he had the ultimate system for me. I told him I was out of the market because it would be eons before I could conquer my current DP capabilities.

Lee said he wanted to just note a few of its outstanding features that may be of particular interest to me. "It has a Mediterranean-blue control panel, with real mahogany veneer on the sides that matches the bright work in your grand salon, plus a metallic gold accent trim that complements the beach-tan colors of the rug in your aftercabins."

I told him to place the order.

Letters to Stone should be addressed to him at Suite 222, 2233 Wisconsin Ave. N.W., Washington, D.C.

Reader Commentary

Arbitration Can Benefit User in Most Instances

By Dick H. Brandon
Special to CW

Alan Taylor appeared to be doing a disservice to the user community when he espoused the dangers of the arbitration clause [CW, July 31]. This is a complex issue, but in general, arbitration always benefits the weaker party — and one must clearly recognize the user as the weaker party in the hardware area.

Perhaps a prime reason for considering arbitration is that IBM is adamantly opposed to it. I am only aware of two instances in which IBM has acceded to arbitration — and then only in extremely large procurements. IBM believes it is best served by litigation, so it refuses to even consider arbitration, which must mean it is better for the user!

Considering Alan Taylor's arguments:

First, the NCR Corp. clause is not "especially stringent." It is a perfectly normal, acceptable arbitration clause which I will gladly accept as a user representative in negotiation. (The only exception is the use of a single arbitrator — I typically prefer a three-person panel.) The clause simply states that in the event of a dispute, it will be settled by arbitration rather than litigation.

Next, Taylor said "arbitration is quick" — which is risky for the user. This is ridiculous, and a way of turning an advantage into a disadvantage.

Look at the record of typical litigation: IBM vs. Catamore, the cause of action in 1969, complaint filed in 1971, trial in 1974, remanded for new trial in 1976, new trial scheduled for 1978, settled (I suspect out of pure exhaustion) in 1978. How does it benefit a user to wait 10 years for a settlement and/or award when by then the wrong has been forgotten?

Does it even make sense to litigate unless you are certain of recovering millions? What do you do with a $10,000 dispute on maintenance quality?

Further, according to Taylor, "arbitration is expensive." This is patent nonsense. Litigation is expensive, and arbitration is extremely inexpensive by comparison.

Reasons for Arbitration

Here are the reasons arbitration should be considererd by the user, in almost any type of contract in the computer field:

- Arbitration is quick. Disputes can be settled in weeks or months, and the user and vendor can concentrate on the business at hand and retain a relationship.
- Arbitration is inexpensive. Legal fees, witness fees and expert fees can be minimized. Both par-

(Continued on Page 50)

The Taylor Report

LEAA Decides to Allow Basic, Cobol to Compete

By Alan Taylor
Special to CW

The progress on the Basic standard fronts has been impressive lately. A minimal draft standard is now available from the Computer and Business Equipment Manufacturers' Association (Cbema), but that is only part of the story. At Dartmouth, the computers are waiting to print out the final version of the suggested U.S. draft for a meeting later this year with the Europeans, and while there are some differences, one extended Basic is probably going to look much like another by 1980! Meanwhile, behind the scenes there has been an interesting development.

This is the first time the standards community has had two really directly competing languages — Cobol and Basic. While the concept behind standard languages had been to prevent computer users from being "locked in" to their current computer vendor, the insistence on using only formally accepted standards had effectively eliminated Basic from consideration in competitive bidding. This was not the concept's intent.

Jim Wogaman of Columbus, Ohio, was one of the users who found this exasperating, to say the least. His problem was that $50,000 with Basic bought some of the Ohio police stations more effective service than $90,000 would have if they had had to use Cobol (and they didn't have $90,000!) Yet, the powers that be, particularly Wayne Hudson in the Washington headquarters of the Law Enforcement Assistance Administration (LEAA), said that to facilitate open bidding and trouble-free conversion to the next generation of equipment, only federally approved standard languages could be used. There was only one such language — Cobol.

Moreover, as Dr. Gerald Isaacs of the Basic standardization effort has confirmed, the Basic languages that are currently available are simply not standard.

So, on the surface, Hudson's position was correct not only according to federal regulations, but also according to the facts. If an installation used today's "Vendor X Extended Basic" and wanted to upgrade in about three years, it would find that equipment from vendors Y and Z would not be able to run that Vendor X Basic, so the dreaded lock-in might have occurred, and the whole concept of the advantages of standards might have been lost.

Unprecedented Situation

Technically, the situation is unprecedented. The development

(Continued on Page 50)

LEAA to Permit Basic, Cobol Competition

(Continued from Page 49)

of Cobol was an experimental effort and cannot be taken as a real precedent. Moreover, in the case of Cobol, while the prestandard-compiler situation existed (from 1959 to about 1965, and to a much lesser degree into the early '70s), there simply was no real vendor-independent competitor. PL/I was not in the ball park for vendor independence, no matter how strong its merits might have been.

But now, before the Basic standard, there will be an existing recognized language or languages at the same time a competing language is being standardized. The question is whether everyone has to wait to get the finally approved language standards (still some three or four years away in the case of extended Basic) before open competition between the two languages is permitted.

And to face this conundrum, LEAA held a conference last month in Alexandria, Va., at which Jim Wogaman faced not only Wayne Hudson, but also the massed representatives of standards and government technical establishments in one of the most powerful turn-outs of which I have heard.

Translators Central

The outcome of the meeting really revolved about the fact that good source-language translators are already available for changing one Basic to another. This availability may only apply to source languages as simple as Basic, but on the other hand it may also be true of technology generally. We will have to wait and see.

In any event, in the future, such translators would presumably be able to translate the current nonstandard, vendor-selected "Extended Basic" elements at source level to whatever the new Basic standard turns out to be. So as long as those translation features are available at the end of this Basic generation, there is no need to fear the anticompetitive lock-in situation (known as sole-sourcing in government procurement circles).

The meeting resulted in a major improvement in everyone's understanding of the standards process, and LEAA is to be commended. I believe Wogaman will get what he wants, and that's good.

Other government agencies that haven't yet faced the problem of avoiding sole-sourcing and yet permitting Basic to compete don't need to go through the same procedure. They can simply evaluate LEAA's work.

What is needed now is for many Basic manufacturers to go on the line and, as normal policy, agree to make such translators for their own systems available in the future, possibly for an extra charge, to people who purchase computers with today's prestandard compilers.

The translation facility should be available — particularly if the user wants to move to competing equipment. After all, the idea of standards, from the manufacturer's point of view, is to extend the market. If making these facilities available means opening up the massive Cobol marketplace years before it would otherwise occur through standardization, then possible future risks can be outweighed.

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Arbitration Can Be Aid to User

(Continued from Page 49)

ties prepare their positions in equal time, and present them. Excluded are years of pretrial discovery, interrogations, depositions, all with associated legal costs.

- Arbitration is less awesome. Employees and management can give their testimony in a less awesome environment, even though they are under oath as well.
- Arbitration is not as publicly embarrassing. Where publicity is embarrassing for the user, it can be contained in a private arbitration; where it is useful, it can still be released.
- Arbitration can be more technical. It is safe to say that judges and juries have no understanding of the complexities of DP. Arbitrators can be selected with experience in DP (note the NCR clause reproduced in the Taylor Report).
- Arbitration is more conciliatory. Litigation often stands or falls on such technicalities as "contributory negligence," the "clean hands doctrine," "statutes of limitations," and "willful intent." Rulings often are black or white, whereas rulings in arbitration can be more mediative.
- An award in arbitration is binding. There are no expensive appeals (except in the case of obvious errors).
- Unless your business is litigation, it would appear arbitration is in fact the better user alternative.

Although I never thought I would say this, my hat is off to NCR — its arbitration clause is a winner!

Brandon is president of Brandon Consulting Group, Inc. in New York City.

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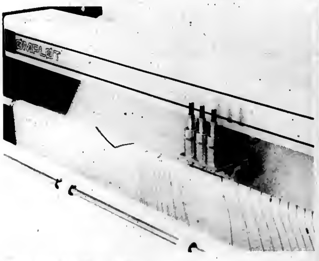

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Ohio-Based Operation

Market Chain Finds Packages Pay Off

By Don Leavitt
CW Staff

MAPLE HEIGHTS, Ohio — Perhaps it doesn't take a genius to run a good DP operation, but Walter Genius, the programming manager at the Pick-n-Pay division of First National Supermarkets, Inc., here has a thriving activity on his hands.

The company's installation is built around a 512K IBM 360/65 running two shifts a day, 5-1/2 days a week under DOS enhanced with CFS, Inc.'s Display Operator Console Support (Docs) package and Westinghouse's teleprocessing monitor, Westi.

The four people in the programming group — including Genius — have one partition available to them at all times so there is none of the tension that often separates programming and operations personnel when test time is needed. Beyond that, the manager noted, all the programmers are former operators so they appreciate the need to get production work done, first and foremost.

A year ago when Pick-n-Pay was converting from IBM 2314 disk drives to Telex Corp. 3330-type units, it became clear the software library system then being used by the center was too limited: it couldn't handle the new drives. Through a replacement was needed, Genius had various pressures to consider.

"The supermarket industry works on one of the lowest net profit margins of any business, so it followed that we would look for a library system that gave us the most for our money," he explained. "But that doesn't mean we were ready to compromise on quality. We pinpointed areas on which we could not yield. Simplicity of use was one. Others were the ability to protect library modules and to temporarily modify those modules," he added.

Genius sent requests for information to a number of library system vendors. He never heard from some of them, but Management and Computer Services, Inc. (Macs) sent data about its product, Pulmacs, and an offer of a 30-day trial so Genius figured he had little to lose.

It was "love at first sight," to hear him describe it, "providing us everything we had hoped for. I feel it is critical in today's demanding environment that computer professionals consciously strive to select products based on their usefulness.

"The technician in us continues to play an important role in our product decisions, sometimes with detrimental results," he noted, adding "we fully expected problems in converting our library to the Pulmacs system, but soon found we could do it easily by writing a simple program to dump our old library to tape and then load the modules into the Pulmacs library."

Whenever Genius talks about the success of his decision, the conversation quickly comes around to talk of simplicity. "In our environment, many programs are modified temporarily to satisfy special one-time requests. With Pulmacs," he pointed out, "it was not necessary to write new programs. Instead, we could make temporary changes and execute them.

"However," he emphasized, "our programmers also find Pulmacs easier to use than our old system when permanent changes are to be made in our source statement library.

Summing up, the manager noted he hadn't done an extensive evaluation of all possible library systems and that Pulmacs wasn't the most expensive alternative "so there may be some features we don't have, but the system is doing what we want it to do and that's what counts."

'Compaktor' Manages Disk Space As Option Under 'FDR' Software

CLIFTON, N.J. — A disk management utility program, Compaktor is now available from Innovation Data Processing as a separately priced option for its Fast Dump Restore (FDR), itself a utility that dumps and restores disk files in IBM OS and VS environments.

FDR is said to dump the contents of IBM 3350-, 3340-, 3344-, 3330- and 2314-type disks to magnetic tape — or return dumped data sets to disk — two to five times faster than IBM's standard OS utility. FDR also uses half the CPU time and as little as 25% of the EXCPs of IEDDASDR, a spokesman claimed.

The Compaktor option can reorganize direct-access volumes under OS, VS or MVS at FDR speed, he continued, noting that Compaktor eliminates free space fragmentation by merging multi-extent data sets into one extent and placing the fragmented space into one contiguous free space area.

The new facility also has a flexible feature for positioning data sets singly, in groups or in sequence. This eliminates excessive arm movement on the volume, therefore decreasing the total access time needed to retrieve data sets, the spokesman asserted.

Compaktor also offers the user the ability to change both the size and location of the Volume Table of Contents (Vtoc) on any of the units under its control, he said.

The spokesman acknowledged that IBM's user group, Share, has offered its members a package with "some of the features of Compaktor" and several packages available commercially also provide some of its capabilities, "but as far as we know, this is the first time they are all together in one place."

Compaktor costs $2,000 for the first CPU at a user site. The prerequisite FDR (and its Data Set Functions modules) costs $4,000 on the same basis.

Innovation is at 970 Clifton Ave., Clifton, N.J. 07013.

Help Wanted

A special report on data base management systems (DBMS) will be part of the Oct. 30 issue. We welcome suggestions on topics to be covered as well as articles considering generic topics or describing user experiences with the systems.

Write-ups should focus on problems and solutions affecting any part of the user's expectations, selection, implementation or use of a DBMS — or, if appropriate, why the project failed.

Contributions should not exceed 1,200 words (four or five double-spaced pages not counting charts or artwork, if any) and should reach Don Leavitt, Computerworld, 797 Washington St., Newton, Mass. 02160 by Sept 20.

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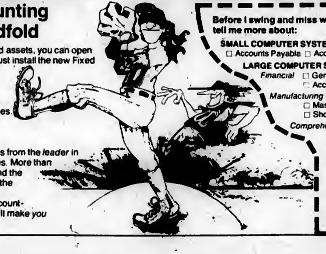

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RCS Research Firm Offers Pick of Reports, Studies

MINNEAPOLIS — User organizations can now choose their degree of participation in, and the amount of material they want to get out of, studies on remote computing services (RCS).

Info-Dyne, Inc., a research firm that has been tracking RCS and their interactions with users for several years, has now divided its services into three distinct options and welcomes users in all of them, according to a spokesman for the firm.

Intended to help the user acquire just the support he can afford, the options allow him to select specific products or services based on need, the spokesman noted.

The Report Option under the Value-Added Services Package (Vaspak) operation provides a user with Volume 1 of Info-Dyne's *RCS Guidelines*, a descriptive report on *RCS in the U.S.* and any 13 of the detail reports the company has on individual RCS vendors.

Final item in the $4,995 option is one of Info-Dyne's reports focusing on how well a particular industry utilizes RCS, the spokesman said.

Vaspak's Study Option includes all of the Report Option offering, plus sponsorship in a multiclient study and participation in a half-day seminar, he noted, adding that this package costs $9,995.

The Research Option adds sponsorship of another multiclient study and another half-day seminar to the Study Option and costs $14,995; Info-Dyne noted from Suite 196, 4600 W. 77th St., Minneapolis, Minn. 55402.

Micro APL Not Ready Yet

ALBUQUERQUE, N.M. — A spokeswoman for Microsoft has confirmed the company is developing an APL compiler or interpreter for microcomputer users, but she vehemently denied rumors such a product is nearly available for delivery.

There is "no way" anyone will see the product in the third quarter of this year, she said in reaction to one version of the rumors. "It's not close. He's still writing it," she added.

She refused to identify the developer or put callers in touch with him or anyone else associated with the company. She explained there had been "many calls" and the developer "just doesn't have time to talk" about the project.

She bent enough, however, to offer a one-page overview of the system to anyone interested, "but that's all we've got on it now."

Microsoft is at Suite 819, 300 San Mateo N.E., Albuquerque, N.M. 87108.

NCR Package Aids Doctors

DAYTON, Ohio — Monitoring and compiling patient treatment records in a doctor's office as well as providing printed summary reports for each physician are two functions of a software package unveiled by NCR Corp.

The Interactive Clinic Billing System can run on a 64K-byte NCR I-8230 configuration with a 10M-byte disk subsystem and process approximately 6,500 patient accounts, encompassing about 75,000 detailed charges and payments, a spokesman claimed.

On-Line Update

Initial information on each patient is entered via a CRT terminal and as tests or treatments are given, the data is updated, the spokesman said. These records may be accessed at any time during a working day, he added.

The system produces a daily report listing all activities and a breakdown of these activities by physician.

The system also provides information to assist the clinic in analyzing medical activities by procedure, diagnosis, cost center and physician. Additionally, monthly statements are prepared, showing the patient's balance and the details of all transactions that have occurred during the month.

NCR's clinic billing system costs a one-time fee of $3,000.

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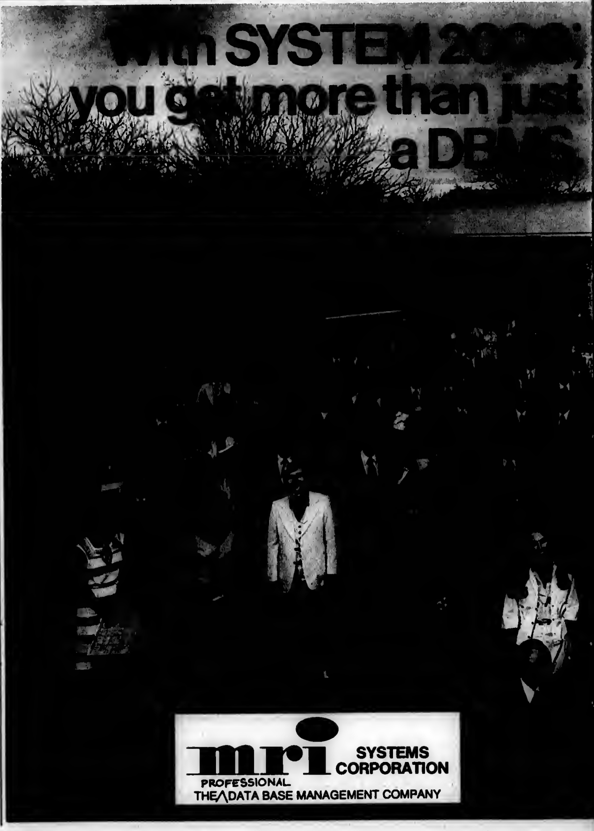
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Loader Update Eases VM/CMS Operations

BOSTON — Release 5.0 of a loader for unmodified Conversational Monitor Systems (CMS) running under IBM's VM/370 contains four separate operational commands, according to its vendor, Rational/Software, Inc.

The first command, RLOAD; functionally replaces the LOAD command distributed by IBM for its systems, a spokesman said, while the second, LINKEDIT, creates a relocatable module on a CMS disk that can be loaded at high speed during execution.

An RSB command, also included in the software package, structures a "segment" file on the CMS disk, he continued. Although the segment file is relocatable, the command estimates a current program's execution-time location and thereby eliminates the need for relocation in a production subsystem.

Finally, the package contains a BIND command which creates a standard Text file out of its input stream.

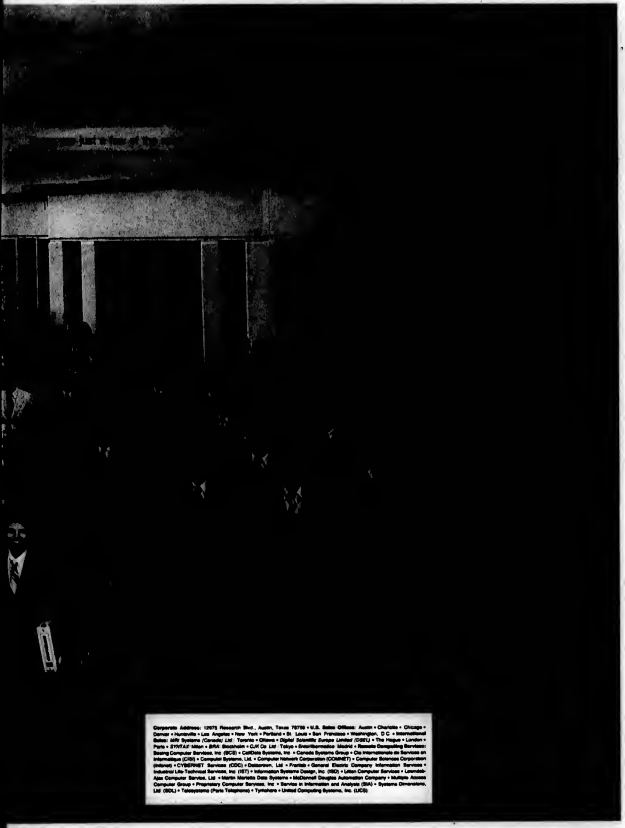
In addition to reading CMS Text and TXTLib files, each command also reads sequential and partitioned data sets directly from an OS/VS direct-access device, according to the spokesman. The RSB command and associated execution-time support allows the user to assign storage to common areas and pseudo-register symbols with control statements.

Modular Application Systems

Modular application systems can then be constructed using either Fortran or PL/I, without needing to avoid data structures that depend upon the names of external symbols, the spokesman noted.

All four commands also produce a readable load map, a detailed cross-reference of external symbols, a report of Csect identification information and a "tree" cross-reference that diagrams the call/return structure of the program.

Full or partial package licenses can be purchased for a one-time charge of $4,000 to $5,750. Rational/Software is at Suite 2308, 80 Staniford St., Boston, Mass. 02114.



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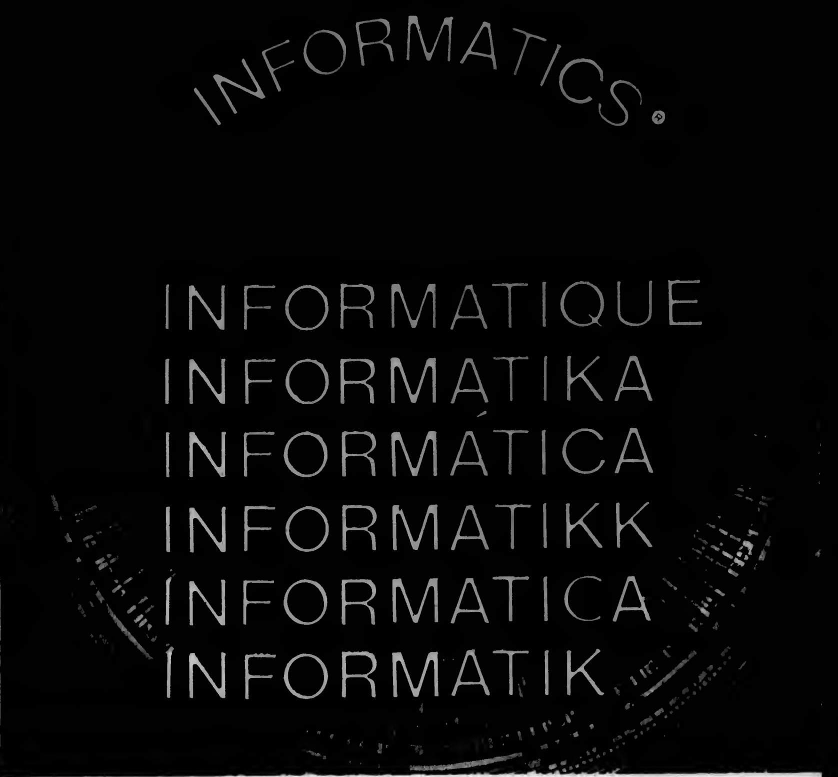

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Monolithic Approach Expensive

Best Tuning Seen Blending Optional Tools

By Michael Ayer
Special to CW

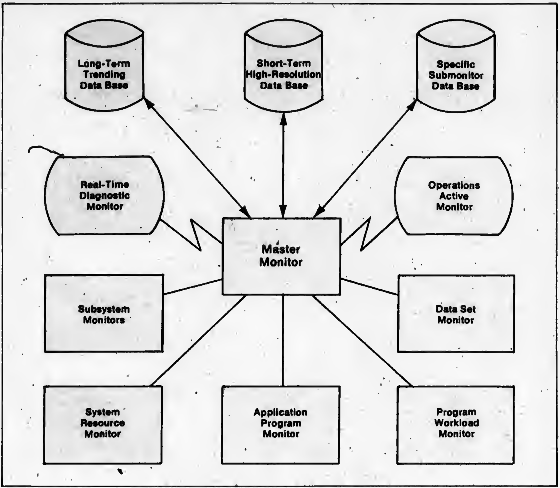
The first sampling measurement tools became available to data processing organizations slightly more than 10 years ago. They were an important contribution, providing the first practical method of determining the empirical parameters of system behavior.

Prior to the development of those techniques, systems analysts were in much the same position as country doctors — forced to diagnose problems by deductions or inferences from external symptoms. The external symptoms could be determined empirically through the use of hardware monitors.

However, as systems software became more complex, it became increasingly difficult to provide more than a general diagnosis.

As with the country doctor, the specific diagnosis and precise treatment could only be determined by going to the expense of "big city" techniques. Like the "big city" surgeon, these techniques did provide a solution; however, they would also bankrupt the patient by consuming not only his financial resources, but also his valuable system time.

The first sampling measurement tools provided an inexpensive, low-overhead method of attacking a broad spectrum of systems problems ranging from complex internal system software interactions to external symptomatic measures. The enhancement of these tools by the addition of certain event-driven measures provided a practical as well as comprehensive methodology for system measurement.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Today, there is a proliferation of measurement products. There's a tool to measure just about anything. Anything, that is, as long as you are willing to pay the overhead of running four, five or more monitors simultaneously.

As today's systems and DP organizations become overtaxed by user demands, we can no longer afford the luxury of this overhead. Because of this, a fourth generation of performance monitors will soon emerge which will be much more sophisticated and much more flexible than the monitors presently available to us.

The *only* concept which will be tolerated by today's complex, heavily loaded systems must be an approach designed with the entire system (and its subsystems) in mind. It must be a flexible, extremely low overhead monitoring system designed to allow the efficient management of performance and diagnostic measures throughout the varied subsystems and resources of the overall system.

The measurement and tuning of complex systems is inherently complex. Therefore, such measurement efforts must be managed for the same reasons that a complex system or organization must be managed: to provide direction and eliminate unnecessary duplication of effort, as well as to provide results in a timely manner and in a useful form. A comprehensive measurement facility meeting the above criteria is what we call a performance management system (PMS).

Such a PMS would be built around a master monitor, resident in the system, providing common services to a variety of submonitors. For example, all sample-driven submonitors will require interfacing with the timer services of the host system and all submonitors (event- or sample-driven) will require data output services.

Architecture of this type will materially reduce system overhead by performing common services only once for all submonitors and will perform specific measurement functions only when they are needed.

Measurement Modes

Such a design also lends itself to a wide variety of measurement modes:

- A long-term trending data base can be developed by sparse, low-overhead sampling of critical indicators. For example, channel and CPU state measures might be sampled only once every 100 seconds; this would provide a statistically meaningful number of samples for analysis with a resolution of about 12 days.
- At the same time, higher density sampling can be done on a general basis to investigate specific areas of system activity or specific jobs during peak periods.

For example, data set activity, CPU usage by specific programs or queueing in a particular subsystem such as IBM's JES2 or JES3 might require sampling at a rate as high as 30 msec to 40 msec for a resolution of about five minutes.

- When operational problems such as thrashing or enqueue conflicts arise, the same master monitor can provide a base for measurement and action-oriented tools. These tools could be activated on an exception or request basis when the master monitor is triggered by a preset condition or when an operator or systems programmer notices a problem situation.
- Diagnostic tools operating with real-time, on-line CRTs could also make use of the centrally gathered data from all the submonitors which were running. The capability of then "freezing" the current set of data (as far as the real-time submonitor is concerned) without affecting the actual data gathering or output of other submonitors would allow the user to track down intermittent systems problems.

Tailored Systems

The complete PMS would be available with a master monitor and a variety of submonitors. Data centers could then purchase only those submonitors they wanted, based on their requirements and not the possibly unrelated requirements envisioned by the vendor.

When the data center needs to add services or capabilities, additional submonitors could be purchased.

Any or all of the submonitors could be invoked without interfering with each other. By eliminating the duplication of effort, only the necessary increase of overhead would be invoked which is required by the submonitors for that unique portion of a given measurement.

The nonduplication of effort extends beyond the measurement monitors themselves. This structure requires only a single address space in which to run, regardless of how many functions are being performed.

This would result in decreased operating system overhead in terms of real memory and control blocks as well as dispatching and interrupt processing.

Coordinated Approach

The integration of monitors into such a PMS allows the definition of a coordinated approach to any and all system problems. The commonly constructed data bases permit the cross-correlation of different types and modes of measurement data. Analysis programs will also be greatly simplified through the use of a common data format.

The variety of forms in which data may be accumulated and presented — long-term data bases, short-term high resolution data bases, specific submonitor data bases, real-time on-line displays, exception-triggered displays and snapshot "freezing" of real-time CRT data — ensures the presentation of measures in a useful form. It also allows timely solutions to systems performance problems.

In short, such a system will permit the computer systems analyst to manage his performance efforts without extensive dollar, time and system investments. Since the constraints of system overhead and availability will be greatly reduced, performance management will be greatly streamlined and more precise.

Ayer is engineering manager at Boole & Babbage, Inc. in Sunnyvale, Calif.

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'Seed' Data Base Manager Gets Query/Report Option

PHILADELPHIA — Once a data base management system (DBMS) had been introduced under the name Seed, it was probably inevitable that the query language/report writer for it would be called Harvest.

And International Data Base Systems, Inc. (IDBS) has indeed announced Harvest as an adjunct to its Self Explaining Extended DBMS (Seed) to be available in October.

Although Seed can be installed on almost any CPU — even a Zilog Z80 microcomputer — with a Fortran compiler and enough memory, Harvest will initially be available only on Digital Equipment Corp. Decsystem-10 or IBM 370 gear, a spokesman said.

The package's query language processor supports English-like commands, enabling users to examine data base contents and to perform some analysis and arithmetic operations on the contents of fields in the base or variables introduced by the commands, he said.

The report definition processor parses free-form English-like report descriptions, after which the report models may be used to structure output from the query processor, using the REPORT command, he added.

Material for the detail lines in the reports may be sorted on up to 15 keys simultaneously, the spokesman claimed, and page headings, footings and control breaks may be defined. Total, percent of total, average, minimum and maximum values may be calculated and printed, he added.

Harvest will cost $6,500 or $275/mo while the Seed software on which it runs — "It's a Codasyl-type DBMS," the spokesman noted — can be obtained for $8,750.

Monthly plans are available for all products, he added from 3700 Market St., Philadelphia, Pa. 19104.

'Safegard' Data Encoding Adapted to Wang VS CPUs

ALBANY, N.Y. — Users of Wang Laboratories, Inc.'s 2200VS systems can now consider two forms of programming support from Computer Linguistics, Inc. (CLI): CLI packages adapted to the Wang environment and custom work including consultation, design and implementation for the individual installation.

Two versions of CLI's Safegard encryption/decryption package, originally developed for the IBM 360 and 370 worlds, are now ready for the Wang users, a spokesman said. Safegard II is described as a high-performance system that allows the user to have secure files with "a minimum of CPU time."

Safegard III utilizes the National Bureau of Standards (NBS) encryption algorithm to compute the coded/-decoded mapping from the user-specified 16-character key. Although the NBS algorithm provides greater security, it requires "somewhat greater" execution resources, the spokesman acknowledged.

Written in Assembler language, Safegard II requires 1K byte of memory while Safegard III uses 4K. The versions can be used concurrently, so the user can devise what he considers the optimal mix of efficiency and protection, the spokesman added.

Distributed on floppy disks, each version can be acquired for $650, with source code available for an additional $300.

CLI is at 26 Computer Drive East, Albany, N.Y. 12205.

Fortran Guide Published

ROCHELLE PARK, N.J. — Programmers should make a concerned effort to develop and write effective computer programs, "especially them who don't want to pick up no more bad habits...and so somebody else can figger out what they done and why."

This, more or less, is the theme of a programming style guide recently released by the Hayden Book Co. for those interested in producing accurate code, "it worked the first time," a spokesman said.

Fortran with Style: Programming Proverbs by Henry F. Ledgard and Louis J. Chmura Jr. illustrates the techniques of writing programs through discussions, explanations, simple programs and numerous maxims. The pithy proverbs, 21 in all, range from such comments as "Don't Panic" and "Think First, Code Later" to "Don't Leave the Reader in the Dust."

The guide covers specification statements, control structures, data statements, mnemonics, routines and subroutines — in short, almost everything that has to do with top-down, well-structured programs, the spokesman claimed.

The 176-page guide costs $6.95 from the Hayden Book Co., 50 Essex St., Rochelle Park, N.J. 07662.

Cooperation

ST. LOUIS — With the cooperation of 11 major St. Louis-based firms, Washington University has established a Center for the Study of Data Processing.

Organized as a unit of the university's School of Continuing Education, the center is the only one of its kind, according to Robert Benson, assistant vice-chancellor, who will serve as director.

Benson said the center will be committed to research, teaching and information exchange, primarily in the application of DP to business and industrial needs.

The center programs will include a professional development program, a cooperative seminar activity established in 1975 between the university and the St. Louis-based firms.

Not So Mini Anymore — Part 4

Microcode, WCS Boost Runtime Throughput

By David J. Saunders
Special to CW

In those minicomputer applications where improvement in processing speed is critical, custom microcoding can produce impressive gains. Until now, however, it hasn't been available to the commercial end user in his business-oriented environment.

Microcode is an extremely low-level language used for writing specialized software routines into a computer's control processor. It performs the functions required within the central processor to move information from storage along data buses to registers, functions required to set condition codes or handle interrupts..

Inherent even to machine operation, these subfunctions are transparent to the machine language or high-level language user and often involve the execution of several microinstructions.

The basic machine instruction is, in effect, a series of operations that take place within the computer. These series of operations are called microinstructions. They perform the same functions as a machine instruction: they elminate the need for hard-wired logic by getting the data onto the internal data buses, moving it around in the working registers, storing it temporarily, setting indicators, and by handling interrupts and a whole range of other events that could and do occur during the execution of a single assembler instruction.

Manufacturer-supplied microcoding supporting the fundamental computing facilities is general in scope and is deliberately unmodifiable. In minicomputers, however, in addition to the inaccessible microcode, user-accessible microcode is made available. This gives software designers more latitude in their work, and can be a powerful processing tool.

Microcoding can be tailored to specific needs, resulting in increased speeds — ranging anywhere from 5% to 200%. Converted Assembly language procedures generally produce a 50% improvement, while for higher level languages, change to microcoded routines usually produce even greater improvements.

Microcode is used for a variety of applications including frequently used algorithms, such as those found in binary search routines or in locating synonym records in direct-access files. Subroutine linkage has been improved through microcoding, but some of the most noticeable improvements have occurred in converting Cobol instructions to microcoded operations.

Now that minicomputer software has matured, the many capabilities previously available only to sophisticated miniusers are now within reach of the commercial end user. As the boundary between mainframes and minicomputers becomes blurred, commercial mainframe users need to acquire more than a passing knowledge of minicomputer terminology.

Microcoding and writeable control store (WCS) are examples of tools not generally available to the mainframe user. Though these users may have a passing acquaintance with terms like microcoding, firmware and control store, the words are part of a technology they are not likely to encounter.

Control Store

Like read-only memory (ROM) in microcomputers, control store contains microcoding that cannot be altered or accessed by the user. It usually consists of integrated circuits in the form of semiconductor chips.

WCS allows the user to microprogram routines and achieve speeds normally associated only with firmware instructions. Today there are at least half a dozen minicomputer manufacturers providing microcoding capabilities. Among them are Data General Corp., Digital Equipment Corp., Hewlett-Packard Co., Interdata, Prime Computer, Inc. and Systems Engineering Laboratories. By providing more control store than the processor functions demand, the surplus is available to the user in the form of programmable, or writeable, control store (WCS).

(Continued on Page 58)

Catalog Lists Mini Software

ENGLEWOOD CLIFFS, N.J. — More than 200 mini- and microcomputer software packages for applications in areas including accounting, marketing, manufacturing, inventory and statistics are described in a catalog released by Resource Software International, Inc.

The "Minicomputer Software Catalog," a three-ring binder, includes six cross-referenced indexes. Systems are classified according to application, industry, language, hardware, code number and product name.

The catalog is scheduled to be updated on a quarterly basis. Subscriber updates are free for the remainder of 1978, a spokesman noted, but are subject to a nominal charge after the beginning of next year.

The catalog costs $29.95 plus $5 postage from the firm at 140 Sylvan Ave., Englewood Cliffs, N.J. 07632.

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Spooling Package Supports Datapoint Users

NEW YORK — A software spooling package introduced by Program Resources, Inc. (PRI) reportedly adds printer management capabilities to any Datapoint Corp. CPU operating under Datashare, PS, Multilink, ARC and other systems that do not provide these functions.

The Spooler System controls up to 25 separate printers through a special Printer Driver program which handles print file names, priorities and commands by using its own queue, according to a PRI spokesman.

Functions controlling queue listings, switchings, deletions and restarts as well as printer operation commands are managed by the package's Spooler Supervisor, he continued, claiming it reduces the amount of time and expense wasted rerunning programs which are printed directly on the printers.

Port printers, as well as the system printer, are controlled from any available CRT station, the spokesman explained. The software system is said to alleviate problems associated with programming these port printers because information bypasses the standard shared disk file route.

The Spooler System also allows fast restarts, deferred printing times, built-in forms alignment, an unlimited copy capability and automatic deletion of sensitive print files after printing, the spokesman added.

Distributed in object code, the package costs $2,000 including documentation and all the modules necessary to operate the system, the spokesman said from PRI at Suite 3120, 120 Broadway, New York, N.Y. 10005.

Microcode Boosts Throughput

Routines	Times With WCS	Without WCS	Time Saved
SINGLE PRECISION			
SQRT	35	82	57%
EXP	55	121	55%
SIN	48	116	60%
ALOG	49	119	59%
.RR*	205	335	39%
DOUBLE PRECISION			
SDQRT	61	146	58%
DEXP	85	183	54%
DSIN	100	255	61%
DLOG	88	169	48%
.DPDP*	203	490	59%

*Exponentiation

Times (in Microseconds) for Fortran Runtime Library Routines

(Continued from Page 57)

Using a microcode assembler and its supporting utilities, the user is able to place common routines into WCS or to extend the computer's standard instruction set.

Often used to combine several software procedures into one firmware instruction, microprogrammed routines exist as "extensions" of the computer's hardware as opposed to the slower executing software routines.

Key to effective custom microcoding is identifying the most frequently used algorithm in an application program and coding only that into microcode. By efficient and sparing use of microcode, a program with as little as 2%-3% microcoded instructions can increase overall performance far in excess of the amount of microcoding. The results are comparable to the difference between software and firmware performance.

Example of Benefit

It is difficult to generalize the resultant increased speeds obtained when converting algorithms to microcode. Recent enhancements made to Perkin-Elmer's Fortran Runtime Library (RTL) can be used to give an idea of the time savings.

The RTL is a library of algorithms frequently used in Fortran programs, e.g., the computations required to determine the square root of a number. Originally coded in Assembler language, 14 of these RTL routines have been reimplemented in WCS. From the figure, it can be seen that the new routines execute in as little as 40% of the original time required by the Assembler language instructions.

In minicomputer applications where increasing processing speeds is important, the availability of WCS and microcode might make the difference. Greater speeds lead to greater flexibility, yet user-microprogrammable computers are versatile for another reason — processors tailored to specific applications are preferable to applications designed around computer limitations.

In exchange for the convenience of microcoding, the user must accept an increase in programming complexity. A thorough understanding of the processor's abilities and limitations is necessary. Though microcoding is a feature only recommended to the computer-wise, users should be aware of its benefits.

Saunders is product manager, operating systems, at Interdata.

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Two Utilities Add Options To Power/VS

DALLAS — A pair of complementary products from Sercon Corp. is said to provide the user working under IBM's Power/VS spooler in a DOS/VS environment with more facilities than were available with Sercon's previous PowerVS Report Manager package.

Sercon's PowerVS Queue Stripper enables the user to extract specified print, punch or reader jobs from the spooling queues for output to a Power/VS-compatible magnetic tape; the PowerVS Queue Loader moves the jobs back from tape to the queues for processing, according to a spokesman.

Tapes in other formats may be produced by the Stripper through the User Exit Facility, he said, adding that once jobs have been selected and successfully written to tape or passed to the Exit routine, they may be selectively deleted, released or left in the hold state in the Power/VS queue.

The User Exit option provides a means of preparing records for microfilming or for nonstandard IBM devices connected on-line to the user's mainframe, he noted.

Selection Criteria

Selection criteria available to the user include job name alone or job name, prefix, class or forms type, the spokesman continued. Control cards are in keyword-parameter format and are usable in either of the utility programs.

Jobs extracted from Power/VS by the Stripper and subsequently restored to the queues by the Loader will have the same job characteristics that existed at the time they were extracted, he emphasized.

Each of the programs is distributed on 9-track, 1,600 bit/in. magnetic tape in a SYSIN format. They are available individually for $750/year or for a combined annual lease cost of $1,000, the spokesman said from 4611 N. Lindhurst, Dallas, Texas 75229.

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Package Manages Payments for Banks

ARCOLA, Ill. — A batch system that reportedly performs all of the key accounting and interfacing tasks associated with a financial institution's telephone, mail or even cable television bill-paying services is now available from Arcola Software.

Paymatic is written in ANS Cobol for both IBM DOS/VS or OS and Burroughs Corp. systems, according to a spokesman. It resides in 54K of memory and is modular to suit the financial needs of the user bank and its retail and commercial customers.

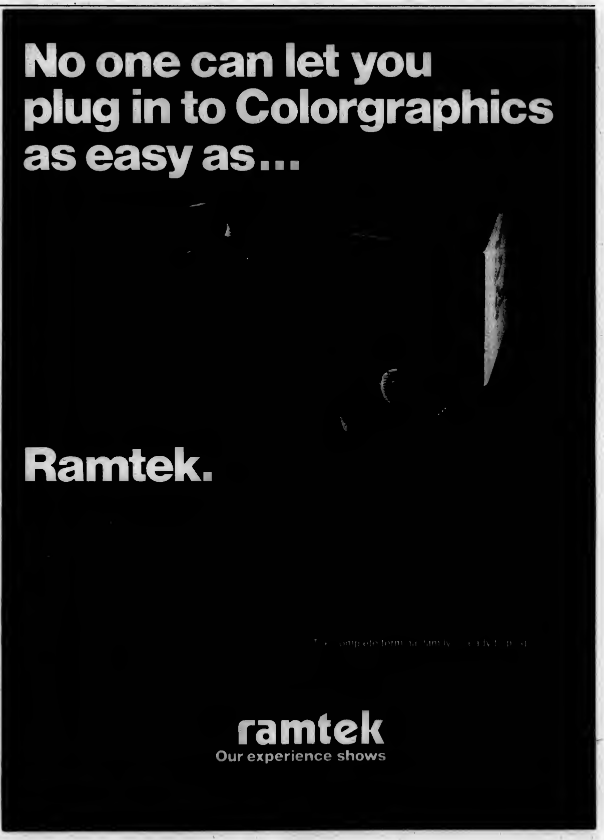
The system pays participating merchants by consolidated checks, or by depositing funds to their accounts, reporting credit amounts and maintaining an audit trail of payments.

The retail customer is provided with all of the standard banking privileges, as well as the ability to enter 12 months of budget information for comparison of actual expenses to be used as a money management report.

The system automates all of a financial institution's internal funds transfers, the spokesman stated. The software will also calculate and assess service charges, prepare general ledger credit, printer statistical reports and generate labels for both customer and vendor.

In addition, Paymatic will also check a customer's balance before a merchant is paid, communicate with internal application systems in user-defined formats and provide various automated marketing assists, the spokesman added.

The system costs $9,500 from Arcola Software, Main St., Arcola, Ill. 61910.



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HARRIS 1620 remote batch terminals feature multiple communication with up to four hosts simultaneously, a wide variety of popular emulators, and transmission speeds up to 56,000 bits per second.

Harris offers three families of remote batch processing products for entry-level, medium function, and high-function applications: the Harris 500, 1200 and 1600 series respectively. As an example of the product-family concept, our economical Harris 1610 is built around a memory-based operating system, performs remote batch and media conversion and includes a wide variety of proven peripherals.

Step forward from the 1610 and you grow into our Harris 1620 with capabilities including multiple emulators (up to four concurrently), to most major mainframes. Either the 1610 or 1620 can be field-upgraded to our distributed data processing products.

Systems for Distributed Processing

You can choose from four Harris 1600 systems for distributed data processing. The Harris 1650 is the first 1600 model to incorporate a mainframe-type disk operating system. It provides data entry and remote batch processing concurrently. Next, our Harris 1660 adds programmability in either interactive or batch modes and accommodates both format-driven and program-driven interactive applications. Then we offer the Harris 1670, featuring the significant advantages detailed below, and the Harris 1680 which uses dual processors for expanded concurrency capabilities.

Interactive Terminals

For the growing interactive market, Harris offers the established 8000 series. The proven Harris 8170 emulates IBM 3270 models 1, 2, 11 and 12 and is SDLC compatible. Emulation is also provided for the IBM 3272 controller. Other Harris interactive products emulate Burroughs, Univac and Honeywell terminals. Our top-of-the-line 8180 includes dual diskettes with 500K bytes of off-line storage, five megabytes of disk storage (optional), and up to 96K bytes of memory. These enhancements permit applications such as local format storage, spooled print and queued transaction handling.

HARRIS 8000 series terminals communicate interactively with IBM, Honeywell, Univac and Burroughs mainframes.

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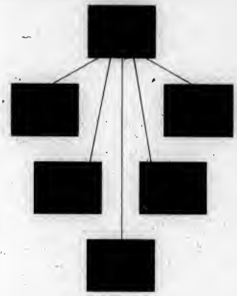

The five typical elements of a distributed data processing system.

Sophisticated new HARRIS 1670 distributed processing system offers local or remote batch processing, data entry, and local and remote interaction concurrently. CRTs are individually switchable between local and host files.

Batch Processing

When devoted to remote batch communications, Harris' multi-task operating system enables the 1670 to perform any of the sophisticated RJE functions of the 1610 and 1620 models. In addition, the 1670 offers local batch processing with ANSI compatible COBOL and batch utilities, including SORT/MERGE.

Data Entry

You can choose from two format-driven data entry packages, easily implemented by data entry personnel. The two packages, Format 10 and Format 41, make your data entry jobs simple, efficient and effective.

User-Written Programs (Local Inquiry)

We offer an easily learned, English-like high level programming language (REGAL), for optimized screen management and for applications such as source document capture and interaction with the local 1670 data base. CRTs running REGAL programs can be located either at the 1670 site or remotely. Additionally, the CRT can control station printers to produce required hard copy.

Remote Inquiry (3270-Compatible Interaction)

This capability enables the CRT operator to connect through the 1670 to 3270-compatible programs at a remote host site.

Selectable Mode CRTs can be used to perform operations in the 1670 mode (including data entry and user-written programs), or to switch to 3270-compatible host programs. Switching is controlled individually at each station by the operator, and the system automatically ensures data integrity when switching from one mode to the other. Selectable Mode enables you to off-load the host by performing processing locally for the majority of your requirements, saving host resources for those occasions when data is not stored locally. Compare this feature when you're evaluating distributed systems!

No Changes Required at Your Host

The fact is, both RJE and 3270-compatible applications can be executed using the 1670 with no changes or new investment in host software. What's more, you *continue* to save since we can upgrade most Harris 1600 and 8170 systems to 1670s with minimal disruptions to your operations.

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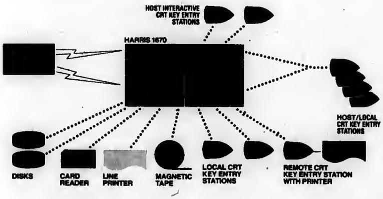
To sum up, there's no need now to shop around for a variety of systems to handle your requirements for remote batch, local or remote interaction or distributed data processing. Start with Harris and you're assured a migration path from the system you need today all the way to one you'll require in the future.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Burroughs-Based System Aids Newspapers

By **Peggy S. Dietsche**
Special to CW

ST. PAUL, Minn. — A basic need for a modern newspaper is the management of paid-in-advance (PIA) subscribers, carriers and circulation reports. Until recently, comprehensive software was available only to large newspapers, but a circulation package that runs on Burroughs B80, B700, B800, B1700 and B1800 CPUs has been developed by LAN Systems, Inc.

Written to accommodate six- or seven-day newspapers, this package provides a variety of carrier billing periods and even makes available multiple subscription billings for other newspapers or magazines.

It allows PIA subscribers to take credit for vacations as well as credit card payments for services rendered. It provides route assignments, census tract information and even lists of nonsubscribers along the carrier routes.

In addition, the software totals carrier "draws" for billing and allots circulation gains to the proper district manager.

Transferability Feature

Once installed, the system reduces the manual work in the circulation department with no increase in computer personnel. Even the smallest implementations generally allow an increase in the number of PIA subscribers, but when the equipment is outgrown, the data base can be transferred to a larger system without change.

Within the system, the PIA module was designed to provide subscribers with efficient and accurate service while also eliminating problems for the carriers. The vendor noted the software supports both carrier deliveries and mailed subscriptions.

The carrier module replaces Addressograph-oriented or manual systems. Its features include posting of carrier payments, credits and other transactions as well as the generation of carrier statements, daily draw sheets, carrier bundle labels and truck manifests.

The circulation reporting module produces the documentation required by the Audit Bureau of Circulation.

The package includes all appropriate data editing and file maintenance routines as well as support for restarts in the event of problems.

A minimum system consisting of a B700 with 32K bytes of main memory and one 4.6M byte disk will support 600 carriers, 7,500 PIA subscribers and a paid circulation of more than 24,000.

The software can be acquired for $9,000, with Cobol source code available under separate arrangements, a LAN spokesman said from 1630 University Ave., St. Paul, Minn. 55104.

Dietsche teaches programming at 916 Area Vocational Technical Institute, White Bear Lake, Minn.

5110 Backs TV Stations

CHARLESTON, W. Va. — Written in Basic for the IBM 5110 minicomputer, an accounts receivable system for cable TV companies is now available from Computer Consulting Corp.

Highlights are said to include both home box office (HBO) and cycle billings, along with coupon preparation and production of an aged trial balance.

The system also accumulates entries for the user's general ledger and supports both a customer history file and an inquiry facility.

Cable TV companies with fewer than 10,000 customers are ideal for the system, according to a spokesman, who added that it requires a 16K Basic-oriented system with a printer and two diskettes.

The package costs $1,250 from the company at 4502 MacCorkle Ave. S.E., Charleston, W. Va. 25304.

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Strassburg Wary of Proposed Act Changes

By Ronald A. Frank
CW Staff

WASHINGTON, D.C. — Far-reaching issues concerning telecommunications and the relationship of AT&T and its competitors are being watched carefully here by a man who used to be very much in the thick of regulatory events.

Bernard Strassburg stepped down as chief of the common carrier bureau at the Federal Communications Commission (FCC) in December 1973 — almost five years ago. But during his nine years in that post, he watched the evolution of the Carterfone, specialized common carrier and first Computer Inquiry decisions and played a major role in each.

As probably the chief architect of increased competition in the telecommunications area, Strassburg is concerned about the impact of the proposed Communications Act of 1978 introduced by the House Subcommittee on Communications.

While he has no problem with the procompetitive intent of the act, Strassburg is concerned that the body of case law which grew up around the present Communications Act of 1934 might be nullified by changes in terminology. "This bill creates needless controversy and uncertainty and as far as domestic common carrier services go, the '34 act is sound. It is still a workable vehicle for regulation," he said in a recent interview.

Problems With ACS

The former FCC official sees some real problems with the Advanced Communications Service (ACS) recently announced by AT&T. As a consequence of expanding technology, "AT&T is pushing the borders of communications as far as possible," he observed.

AT&T's decision to announce ACS on the eve of the FCC's consideration of the second Computer Inquiry was a "wise and crafty move," Strassburg said, and the commission was obviously affected by the action.

"AT&T was saying to the commission, 'Don't shut us out,' and what it has done, in effect, is blow the whistle and introduce a pause into the entire computer communications area being considered in the inquiry."

Because of its size, plus its economic and technical muscle, AT&T has a huge presence in the marketplace and this has to be taken into acount and somehow dealt with, Strassburg said.

On the subject of divestiture of Western Electric from the Bell System, Strassburg said he is not sure divestiture is the right answer. Writing Bell into all markets may not help the problems that already exist between regulated and nonregulated areas in telecommunications. "How can you keep this free from cross-subsidies and predatory pricing. It still falls short of providing a quick answer to the problem," he commented.

Competition will erode the control of the Bell System, and AT&T would not like that since it has been in control of telecommunications for many years, he said.

(Continued on Page 64)

Amana Gets On-Line Skills Down Cold

Special to CW

AMANA, Iowa — The Amana Refrigeration, Inc. manufacturing plant in Fayetteville, Tenn., is hundreds of miles away from the company's headquarters here. But to Amana's central IBM 360/50, communicating on-line with terminals in Fayetteville is as easy as communicating with local peripheral devices, thanks to a Paradyne Corp. PIX-II Virtual Data Link.

"We have a total of 134 on-line applications in our system," Wayne Croy, Amana's technical services manager, said. "These are for numerous engineering, production, parts scheduling, purchasing, receiving and inventory control procedures for our primary manufacturing plant here, and our two plants in Fayetteville.

"Our manufacturing people have to be able to order product parts breakdowns, adjust parts usage, change production schedules, order and receive parts, and update inventory and purchasing records at more or less a moment's notice. We can be notified of a product schedule change at 4 p.m. and be expected to have that change implemented by the start of the next work day.

"And because the DP department is responsible for moving and processing all product information — along with regular DP work — it's important that we provide on-line response to parts inquiries and schedule needs," he added.

"Bringing our Amana, Iowa, manufacturing operation on-line two years ago was not difficult, since the computer was housed in the same building and no communications was necessary. But when we expanded to serve Fayetteville manufacturing, it was a different story," he noted.

Amana first communicated between Fayetteville and headquarters via IBM 2780 equipment. "We would get our manufacturing forecast, purchasing and receiving input from Fayetteville to our host via 2780, then batch-process the information to do complete parts 'explosions,' or breakdowns, and

(Continued on Page 64)

Retailers Advised to Envision Results in Making POS Choice

By Diana Mueller
Special to CW

LOS ANGELES — "To determine what he wants or needs in a terminal system, a retailer should look at the desired results," according to Dan A. Barnes, TRW Corp. vice-president of retail marketing.

"There's an overemphasis on technical considerations these days — whether one should use random-access, read-only, programmable read-only and electronically programmable read-only memories and the like," he said.

"What it really gets down to is what the retailer needs and expects from his system. Data processing and communications equipment are tools to be used to solve business problems. So the key point is how well the tools work."

Toward this end, the retailer should try to list his current and future needs, Barnes continued. "Do I want hourly reports of sales by department? Employee productivity reports? Flash sales? Merchandise transfers? Do I expect to add applications for big ticket inventory, catalog orders and such? Then," Barnes said, "consider a system."

In system selection, the retailer is usually offered three programming alternatives. First, he can accept a vendor's standard program. Second, he can modify parts of a program, customizing it to his needs. Or third, he can train his people to program the hardware elements and write an entirely new program from scratch.

The retailer should first evaluate the quality and available options of the various vendors' standard programs. They are usually the least expensive and the quickest to in-

(Continued on Page 65)

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Amana Improves Its On-Line Applications

(Continued from Page 63)

update applicable files.

"That system had slow response. Even the simplest communications between Iowa and Fayetteville was laborious. We knew we needed to bring Fayetteville on-line to our host," he explained.

After evaluating several vendors and system alternatives, Amana leased a PIX-II Virtual Data Link. PIX-II consists of local and remote control units which communicate with each other via IBM Synchronous Data Link Control (SDLC) protocol and which eliminate the need for the 370X front end and networking software normally required to tie remote locations to a central IBM 360/370 mainframe.

"In addition, we were pleased with what the study showed: ease of operation on the remote end of the data link," Croy said.

The PIX-II local control unit (LCU) is attached to the IBM byte multiplexer channel and communicates directly with the 360/50. A remote control unit (RCU) is located in the primary Fayetteville plant. Attached to that RCU is an IBM 3272 that controls several CRTs and printer terminals.

In addition, the RCU is handling high-speed output peripherals.

The PIX-II LCU and RCU communicate with each other over a dedicated 9,600 bit/sec communications line, with dial-up capability for backup.

"For us, there really was no acceptable alternative to PIX-II," Amana DP manager Tom Crosby said. "Without it, we'd either have had to develop and maintain an IBM Btam or Vtam teleprocessing system or we'd have had to purchase a remote software package — and remote hardware — from another vendor. Even so, only Paradyne could support simultaneous transmission and reception, support combined batch and interactive processing, provide the modular capability and support the diversity of peripherals for true cost-effective on-line performance."

Range of On-Line Devices

Along with the PIX-II RCU, the Fayetteville system includes a Paradyne high-speed card reader and 600 line/-min printer, an IBM 3272 CRT controller, multiple CRTs and a terminal printer in Fayetteville's receiving, engineering, purchasing and inventory control departments.

"With multiple on-line devices and SDLC bidirectional communications capability," Crosby said, "the system can transmit and receive simultaneously. This means authorized personnel at Fayetteville can access parts-breakdown, scheduling and other information from our data files at the touch of a keyboard, while at the same time the host is transmitting and receiving high-volume card, print and input data for soon-to-be new products and updating of data base and stand-alone files."

According to Croy, "this kind of activity is significant when you realize that the system is transmitting and receiving hundreds of thousands of print lines and cards every month and still must respond very quickly to parts, product or scheduling changes. It also must allow Fayetteville (and Iowa) personnel on-line access to the host files whenever necessary. And the entire DP staff, including management and clerical staff, totals 22 people.

Currently only one of Amana's two Fayetteville plants is on-line to the main CPU. The second Fayetteville plant, which began operations in November, will eventually be tied in to Iowa via a second PIX-II RCU and associated peripherals that will be controlled by the existing LCU in Iowa. In the meantime, plant-to-plant communications between the neighboring Fayetteville plants are handled manually, with all Fayetteville-to-Iowa communications sent through the primary Fayetteville plant's PIX-II peripherals.

"As we make the transition to our newer Fayetteville plant," Crosby said, "the contrast between on-line host access and 'off-line' access shows through the people who move from the on-line plant to the new factory. They are used to on-line access and they have a tough time putting up with manual communications — even though it's only temporary — once they've experienced the efficiency of our on-line system."

Strassburg Wary Of Act Changes

(Continued from Page 63)

As to what will happen to all these interrelated issues, Strassburg said it was his feeling that the Communications Act in its present form could not win approval in Congress. "It needs a lot of craftsmanship if it is going to pass," he said.

As an alternative, he suggested it might be possible just to amend the existing act to give the FCC the latitude to deregulate certain areas "that are controlled by market forces." As examples, he mentioned the terminal equipment and resale of services areas.

Asked if he had foreseen the magnitude of the problems that were fostered by the push toward competition, Strassburg said "obviously not." However, he appears to be enjoying his role as regulatory attorney and consultant.

Strassburg apparently is still very much involved in the many issues now facing telecommunications, but even so he admits that he "misses the old excitement" at the FCC down the street.

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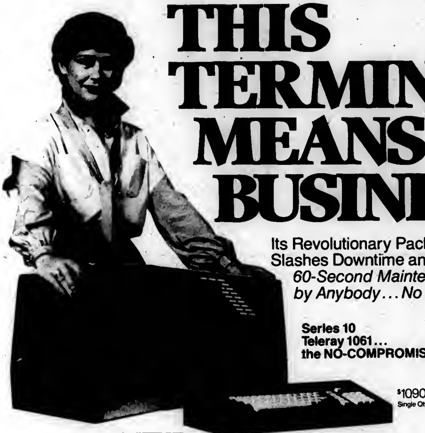

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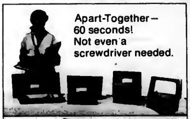

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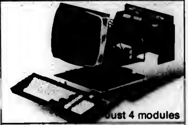

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Retailers Urged to Consider Results of POS

(Continued from Page 63)

stall. If the vendor offers a highly parameterized standard program, the retailer will have quite a number of available options to make the program fit his needs.

For example, in a specialty store transaction set, one vendor may offer the ability to record nonsales data such as merchandise receipts and payroll data by employee — entering this data right into the point-of-sale (POS) terminal. Another vendor may not offer this in a standard program.

"What's important here," Barnes said, "is that by carefully comparing the different options offered in each of the vendors' standard programs, the retailer may find everything he needs now and allow for future growth and changes."

Even with the highly parameterized programs available today, some custom modifications of the program modules may be needed. Should the retailer find this situation, he must make sure the vendor is willing to do them and, just as important, has the resources to do them. The retailer should also be certain that it is not just a selling ploy; that is, the vendor won't try to shift him away from doing the modifications once the contract is signed. In addition, a standard program must have excellent documentation if it is to be modified cost-effectively.

Total custom programming by the retailer requires other vendor capabilities. How willing is he to support the effort? Is technical consulting available? Does he offer training classes for programming the system? What hardware is required to compile the program? Is this hardware readily available?

And if the responsibility of custom programming is split, can the retailer integrate his program with other programs? For example, if a department store decides to write one part of the program, say for the terminal, and the vendor is going to write programs for the back office, there must be a provision to integrate them and define who is responsible for those tasks.

If getting a system programmed to do exactly what is required today were the retailer's only concern, the job of selecting a vendor would be a lot easier. However, most retailers plan to live with their investments for eight to 12 years.

"Future flexibility of a POS system," Barnes stated, "is the key to keeping up with the constantly changing retail environment. New policy decisions that result from legislation, competition, management direction shifts or growth cause procedural changes, and these changes often require program changes. For example, tax tables, data collection needs, delivery rates and credit and check cashing policies are frequently changed store procedures."

Changes Needed

Or consider the retailer who adopts a travel/entertainment or bank card in a store which previously carried only house cards. This policy change requires a procedural change. It will also require programming changes in the terminal transaction set, the application software and perhaps the development of an interface to a foreign data base. The retailer should have a good idea of how easy it is to implement these types of changes.

"The most important thing for the retailer to keep in mind," Barnes said, "is how a particular POS system can help run the business to achieve better results. In retailing, this means increasing inventory turns, reducing expenses and improving employee productivity. The biggest memory and the most complex transaction set aren't much good if it is difficult to make changes to improve results.

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Jay Chapin (left) is President of **Taylor Rental Corporation,** Springfield, Massachusetts. Ed Schenk is NCR District Manager.

"The only noticeable change was a 30% improvement in thru-put," says Jay Chapin of Taylor Rental.

CHAPIN: At first, we had some reservations about going to a computer mainframe with the latest circuitry and new architecture. But we needn't have worried. Downtime on our NCR Criterion has been less than negligible.

NCR's SCHENK: And you run almost around the clock.

CHAPIN: All but 18 hours a week. But that will improve because we are installing NCR's VRX (Virtual Resource Executive) right now.

SCHENK: With virtual memory, you will be able to run more jobs simultaneously. Up to 35 jobs at once. VRX also dynamically allocates memory and resources. It takes care of virtual memory swapping. It constantly monitors the job mix for memory thrashing and program loops and, when it finds a problem, adjusts the mix automatically to compensate.

CHAPIN: And it will smooth our work flow in the computer room. In a multishift operation like ours, scheduling can be a headache, particularly when the operators change. The new operator doesn't know what the last operator has left undone. But from now on, VRX will do all the scheduling automatically.

"We have the best data processing system in our industry at 70% of the cost."

SCHENK: And the transition to VRX will be effortless.

CHAPIN: We expect that. Easy transition is NCR's long suit. We went to our Criterion 8550 from our NCR Century 201 over a weekend. On Monday, the only noticeable change was a 30 percent improvement in thru-put.

SCHENK: You ran the same COBOL programs on both systems.

CHAPIN: That's right. And it runs some programs written in NEAT/3, too. These programs are over six years old and were written for our first system, a Century 50. We're still using them.

SCHENK: You can now run programs written in NEAT/3, RPG, FORTRAN, COBOL 68 and COBOL 74, all at the same time.

CHAPIN: Taylor Rental is really two businesses. We franchise Rental Centers and we are a hardware wholesaler. Our EDP load is split evenly between the two. Statistics for the industry tell me that hardware wholesalers spend 1.3 percent of sales for data processing on the average. We spend 0.9 percent. And I'll match our system against any in the industry. That tells me we have the best data processing system in our industry at 70 percent of the cost.

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Does Character I/O Processing

Novas, Eclipses Get Programmable Controller

WESTBORO, Mass. — A programmable communications controller that performs character I/O processing in parallel with a Nova or Eclipse host processor has been introduced by Data General Corp.

The DCU/200 reportedly combines with the firm's DG/CS communications subsystem to provide an efficient interface with communications networks for both dedicated and distributed processing systems.

The DCU/200 enhances system performance by relieving the host computer of character interrupt processing. It effectively transforms a character-oriented communications environment into a more efficient message-oriented system for host computer processing, DG said.

The DCU/200 occupies one slot in a Nova or Eclipse chassis and interfaces with the direct memory access channel. The DCU/200 contains 4K 16-bit words of 400-nsec local memory, a real-time clock and its own I/O channel interface to asynchronous and synchronous communications controllers. Beyond its local 4K-word addresses, it can directly access host computer memory, the firm said.

Character-level processsing handled by the DCU/200 includes line multiplexer control, code translation, error checking, special control character handling and message buffer maintenance. These hardware functions are supported by DG's software for synchronous, asynchronous and bisynchronous protocols and by the firm's Hasp II Workstations Emulator software.

Three operating systems support the DCU/200. The Advanced Operating System (AOS) allows concurrent realtime, time-sharing and batch operations on Eclipse processors. The Realtime Disk Operating System (Rdos) provides a program development and execution environment on Nova and Eclipse machines. The Real-Time Operating System (Rtos) provides multitasking run time capabilities for Nova and Eclipse CPUs.

A typical data control unit with 4K-word memory, Real-time clock, cross interrupt facility and I/O bus costs $3,900 from DG, Route 9, Westboro, Mass. 01581.

CRTs' Design Aims to Reduce Service Needs

MINNEAPOLIS — A line of asynchronous, general-purpose CRT terminals designed to minimize downtime and service requirements through modularity of design has been announced by the Teleray Division of Research, Inc.

Each Series 10 terminal consists of logic, monitor, power and keyboard modules that lock into place within the unit cover and can be replaced without tools in 60 seconds, the firm claimed.

The first model in the series to be available is the programmable Model 1061 intelligent terminal, which is based on MOS Technology, Inc.'s 6502 microprocessor and features a 12-in. diagonal screen with a 7 by 9 character matrix.

The teletypewriter-compatible Model 1061 is suitable for time-sharing as well as coupler modem applications and yields a data transmission rate of 9,600 bit/sec, a Teleray source said.

This model also features function keys, I/O and peripheral speeds, peripheral on/off and wide/narrow character display. It also offers scroll or page mode editing with cursor addressing, three-segment clear and insert/delete functions and transmission in character, line, message or page modes.

The Model 1061 operates in format and protect modes with four-level highlighting — dim, blink, inverse video and underlining — and in transparent mode, where control codes are displayed, the firm added.

The modular design of Series 10 terminals should expedite shipping and service, the firm said, explaining that faults can be promptly localized over the telephone and replacement modules shipped immediately.

The Model 1061 costs $1,090. Teleray can be reached through P.O. Box 24064, Minneapolis, Minn. 55424.

Racal-Milgo Catalogs Used Gear Offerings

MIAMI, Fla. — More than 15 models of used modems and other data communications products, refurbished and available under warranty from Racal-Milgo Information Systems, Inc., are described in a free 24-page catalog offered by the firm.

Manufactured by the ICC subsidiary of Milgo Electronics Corp. before Milgo's merger with Racal Electronics, Ltd., the models are available at savings of up to 79% over original purchase prices.

Included in the catalog are specifications and prices of ICC modems that operate at speeds from 2,400 to 9,600 bit/sec.

Copies of the catalog are available from Racal-Milgo, 8600 N.W. 41st St., Miami, Fla. 33166.

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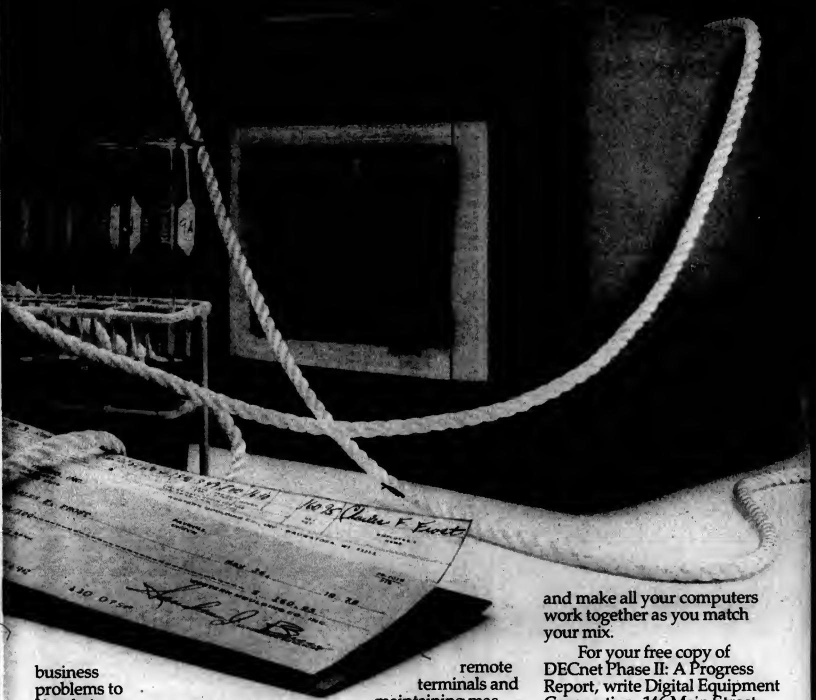

business problems to simulation, large-program runs, and other applications requiring high input-output traffic in multi-user environments.

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Illinois Starts Phone Credit Card System With

By Theodore D. Puckorius
Special to CW

SPRINGFIELD, Ill. — Illinois has become one of the first states in the nation to implement a computerized credit card telecommunications system with voice recognition capabilities.

The system permits state employees who hold telephone credit cards to make calls by talking to a CPU that "understands" English. The computer responds to the caller in English, places the call through automatic route selection techniques and records all billing data on the call.

The system start up in May came after six years of study, analysis and evaluation by the Illinois Department of Administrative Services (DAS), whose Telecommunications Division wrote the specifications for the system and supervises its operation.

Currently 250 credit cardholders are testing the system. It is expected to be used by more than 4,000 employees making more than 330,000 calls annually.

Under the word recognition credit card system, a caller dials a central state credit card number. Once the credit card number is verified, the caller reads the destination number one digit at a time, including the area code, and the computer repeats each number to the caller as it is read. When the destination number is determined to be correct, the call is completed.

Functions Like Decoder

Manufactured by Dialog Systems of Belmont, Mass., the word recognition system functions much like a Touch-Tone decoder. It recognizes and analyzes sound patterns and passes on the information to a Wats Box from Action Communications Systems of Dallas, Texas, for dialing out on the state's private lines.

The system consists of a Digital Equipment Corp. PDP- 11/04 minicomputer, a flexible disk for program storage and a high-speed vector processor. It has the capability of simultaneously decoding any 8 of the 20 voice input channels.

The eight voice channels connect the credit card user to the Dialog vector processor, which makes the word recognition choices. Each word or number spoken by a credit card caller is converted to a digital pattern by the processor so that each number said by any user will be represented in a standard format.

This particular system has been coded to understand speech patterns of Northern males, Northern females, Southern males, and Southern females. The pitches, length and loudness of words are all changed by the processor to remove variations. This processor analysis and subsequent choice of what the computer thinks the caller said takes only a fraction of a second.

Switching System

The Wats Box is a telecommunications control and switching system that consists of an inward and outward phone line-switching matrix controlled by a Data General Corp. Nova 1200 minicomputer with 32K words of processor memory, backed up by fixed disks.

The Nova 1200 provides the control for switching the incoming lines to the outgoing lines. The minicomputer also controls the disk files, magnetic tape storage for logging call information and the system console.

The disk contains credit card authorization information and all other system program and control data.

System Console

The system console, a teleprinter, allows the user immediate access to add, change or delete credit card authorizations. The console is also used to control restrictions by time of day, by geographic range and by various other priorities.

It also allows for continuous system status printout such as just completed calls, illegal authorization numbers, system component failure or telephone company line problems.

As initially installed, the system, located in Springfield, is accessed via In-Wats lines. There are both in-state and out-of-state In-Wats lines — 20 lines in all.

The system also accommodates other types of inward lines: local business lines, foreign exchange lines, tie lines, etc. In-Wats are used because of the diverse geographic origin of the state's credit card calling.

$222,000 Savings

The state of Illiniois expects to realize a savings of approximately $222,000 during the

---

For End Users, OEMs

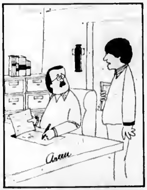
Two 'No Frills' Terminals Offered

BRIDGEPORT, Conn. — Two "no-frills" terminals have joined Computer Peripheral Corp.'s CRT line: the Cops 10 and Cops 20.

The Cops 10 and 20, aimed at both end users and OEMs, offer a detachable upper/-lower case typewriter-style keyboard, a 12-in. nonglare screen, cursor control keys, direct cursor addressing and a transparent tape mode.

Computer Peripherals promises a 24-hour repair of any breakdowns from the time the terminal is returned.

The Cops 10 costs $750; the Cops 20 is priced at $995 in an OEM version and $1,095 in an end-user version. The vendor is at 1225 Connecticut Ave., Bridgeport, Conn. 06607.



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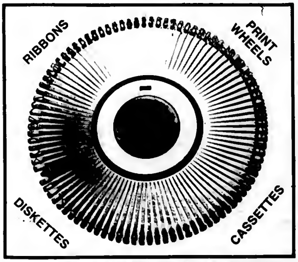

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Voice Response

first year of operation of this system. The state currently spends $42,000/mo on telephone credit card calls. This system will reduce this cost to $23,500/mo for several reasons.

First, 25% of all the credit card calls terminate as local Springfield calls. Once the caller reaches the credit card system in Springfield, no further long-distances are incurred.

The second major cost saver is increased use of the State of Illinois Network. This network uses Illinois Bell Flexible Route Selection (FRS) and is virtually invisible to the user.

The FRS employs six-digit translation to complete calls on Foreign Exchange (FX) lines, Wats lines or the Bell System toll network. The FRS evaluates the area code and prefix dialed by the user and selects a state-leased line for that destination, if the line is available.

Least-Cost System

This process seeks the least cost available facility automatically: FX first, Wats second, then toll lines. The Bell central office computer provides DAS with a record of all calls, including FX and Wats completed, for usage-sensitive billing back to the using agency. These records also provide information for network management.

The voice credit card system takes advantage of the network for credit card calls that terminate outside of Springfield. The typical credit card call uses the network when it is otherwise idle. Since the Network FX and Wats facilities are flat-rate facilities billed to the state by the telephone companies, most credit card calling over the network does not incur additional charges for the state.

To ensure security and proper use by state employees, the system contains credit card authorization information which may be used to restrict credit card use if necessary.

Puckorius is the director of the Illinois DAS and a former commissioner of the General Service Administration's ADP and Telecommunications Service in Washington, D.C.

NCR Bisynchronous Teleprinter Compatible With IBM 3275

ITHACA, N.Y. — A bisynchronous printer terminal said to be compatible with the IBM 3275 CRT station has been announced by NCR Corp.'s Terminal Systems Division.

The NCR EM-T5 comes with keyboard, printer, integrated 2,400 bit/sec synchronous modem, power supply and 2K-word processor — all in a carrying case, the firm said.

The complete unit, which weighs about 30 pounds is compact enough to fit under a standard airline seat, according to a spokesman.

The EM-T5 works with existing multipoint IBM 3275 Ebcdic data base systems in a poll/select mode, he noted, and functions at sites where "larger conventional" bisynchronous CRT terminals are not suitable.

The EM-T5 simulates the 3275 unformatted display mode and is intended for inquiry/response applications.

The device also provides editing capabilities to facilitate data entry and is called "virtually noiseless" since it features a nonimpact printer.

The terminal is equipped with an alphanumeric keyboard. The 10 embedded numeric keys are color-coded to assist identification, NCR said.

Built-in diagnostics are also included, the spokesman added.

The EM-T5 costs $5,000 from NCR at 950 Danby Road, Ithaca, N.Y. 14850.

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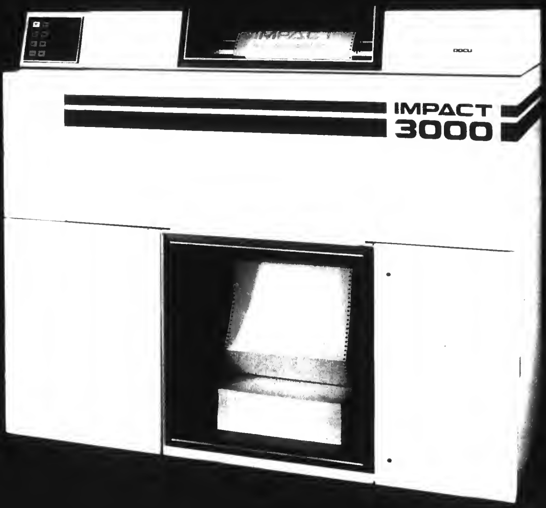

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Terminal Transactions

One Reader, One Reader With Printer

Kodak Unwraps Microimage Retrieval Units

By Catherine Arnst
CW Staff

NEW YORK — The Eastman Kodak Co. unveiled two intelligent microimage retrieval terminals here recently as it entered the "computer peripherals field."

The terminals — the Kodak IMT-150, which is both a reader and hard-copy printer, and the Kodak IMT-100, which is a reader only — were designed as low cost, alternatives to magnetic storage of large volumes of digitized source documents.

While disk packs will store the data necessary to reproduce fewer than 1,000 documents, a 4- by 4- by 1-in. microfilm magazine will store the images of more than 10,000 letter-size documents at a fraction of the cost, the firm said.

The terminals employ an Intel 8080A microcomputer for memory, control and diagnostics. Each contains 18,000 bytes of read-only memory (ROM) and 1,000 bytes of random-access memory (RAM).

The terminals can be used as stand-alone units or attached to a host CPU of "just about any manufacture" via a Kodak interface module, the firm said.

By incorporating native intelligence with an information retrieval system, Kodak was able to provide rapid access time, a memory that an operator can use and built-in diagnostics for error detection and correction, a spokesman claimed.

The ROM stores all programs related to machine operation and control, and the RAM serves as a data bank for information to be stored temporarily and then erased. The latter memory allows an operator to store up to 40 six-digit reference numbers at one time, Kodak said.

Retrieval requests are handled at an attached keyboard. The terminal is capable of searching film at up to 15 ft/sec until it finds the requested image.

It can handle a variety of film formats, and three programs for searching various film formats are available at any time. Single and multi-level film index schemes are also available.

When linked to a host CPU, the IMT terminal acts as an on-line storage and retrieval system, Kodak said. Images can be stored on microfilm reels loaded into either Kodak Ektamate or Ektamate A magazines, while the data base is programmed to maintain an index of the location of each micro image plus any current updates.

Through the Kodak interface module, the host CPU can communicate to the IMT terminal and control the retrieval operation for the operator. The terminal can relieve the computer of many control functions required by other computer-assisted retrieval systems, Kodak said.

"For example, the intelligent microimage terminal becomes an on-line peripheral to the host computer. In turn, it can direct immediate retrieval and hard-copy output from a library of virtually millions of source documents or computer-generated images," the spokesman said.

Four Units in Use

Four terminals have been installed for a month here in New York — one each at a department store and medical insurance company and two in banks, Kodak said.

The IMT 150 is priced at about $10,000 and the IMT 100 at about $9,000. They will be available within two weeks from Eastman Kodak Co., Department DP-8025, Business Systems Markets Division 343 State St., Rochester, N.Y. 14650.

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Vertel Credit Card Reader/Writer Works With Variety of Terminals

CLIFTON, N.J. — A credit card reader/writer described as suitable for use with terminals has been announced by Vertel, Inc.

The "Ansi-standard" Series RW-31 Creditloader is appropriate for indoor and outdoor bank terminals, point-of-sale terminals and other types of peripherals used in security applications, Vertel claimed.

Credit cards can be read, edited and written with the RW-31 when connected to a minicomputer or intelligent terminal. Alternately, the device can be used with a "dumb" terminal as a "low-cost" on-site credit card reader, the firm said.

Read-only and read/write modes are featured in the RW-31. Thrift configuration and other single- and dual-channel head options are available, a spokesman added.

The RW-31 is available with a Fairchild Semiconductor Corp. F8 microprocessor with random-access and read-only memories, full I/O buffering and solid state control, Vertel said.

Read-only memory interfaces include byte parallel, teletypewriter and RS-232 with data transmission rates from 300- to 4,800 bit/sec. A power supply in a stand-alone desktop enclosure is also offered.

The RW-31 features a strobe-controlled printed circuit/LED/shaft encoder to determine magnetic head lateral displacement by measurement of the lead screw's rotational displacement, the firm continued.

This design minimizes errors, data loss, damage and jamming from card warpage, thickness variations or foreign materials, Vertek claimed, and allows 500,000 fail-safe operations.

In quantities of 1,000, the RW-31 costs $331 with micro-based electronics and $172 without, the firm said from 125 Ellsworth St., Clifton, N.J. 07012.

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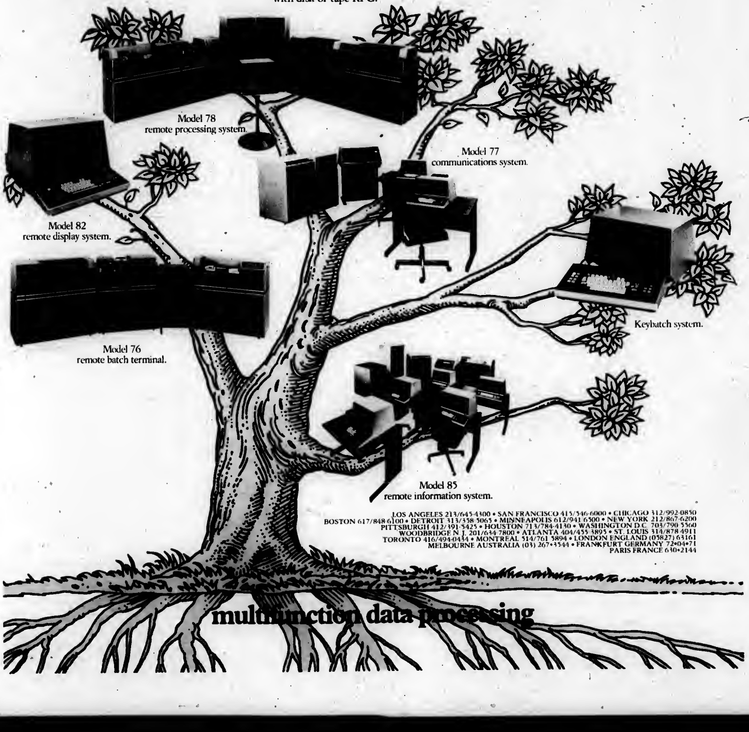
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Ramtek Color Output CRTs Have Raster Scan

Terminal Transactions

SUNNYVALE, Calif. — Ramtek Corp. has announced a three-unit line of color graphics CRT terminals offering raster scan.

The Colorgraphics 6110, called a low-priced bit-per-element color raster scan terminal, features a 320 by 240 by 3 graphics display matrix, a 72 by 24 alphanumeric format and a 13-in. medium-resolution color monitor.

The 6110 offers eight colors and is available in a pedestal configuration, according to a spokesman.

The Colorgraphics 6310, a high-resolution raster scan color terminal, features an 800 by 600 by 3 graphics display matrix, a 72 by 24 alphanumeric format and a 19-in. color monitor, the Ramtek source said.

The 6310 also includes color zoom and pan over the standard 1,024 by 1,024 by 3 memory, the usual programmable colors and a pedestal configuration, he added.

The Colorgraphics 6200A features a 512 by 256 by 3 graphics display matrix and a 72 by 25 alphanumeric format.

This terminal has a high-resolution 13-in. color monitor, offers eight selectable colors and comes in a desktop or rack-mount configuration.

Flexible System

The end user can convert from black-and-white to raster color graphics without the burden of software development costs later, according to the spokesman.

For a new installation, the additional cost of raster scan color graphics is small compared with the advantages, Ramtek said.

All three terminals feature modular, microprocessor-controlled architecture and teletypewriter-compatible interfacing.

The terminals are initialized as teletypewriter emulators, but convert to the graphics state upon demand, the spokesman said. All communications with the host computer are serial asynchronous and in the form of printable Ascii text strings that are generated by high-level applications programs.

The 6110, 6310 and 6200A terminals cost $5,500, $25,000, and $9,950, respectively. An interface from the 6200A to the Xerox Corp. 6500 color graphic printer — called the 6831 color copy interface — is available for $1,000, Ramtek said from 585 N. Mary Ave., Sunnyvale, Calif. 94086.

AJ 841 Gets RS-232 Link

SAN JOSE, Calif.— An RS-232 serial interface option for the Anderson Jacobson, Inc. (AJ) 841 I/O Ascii terminal has been announced by the firm.

The option includes selectable data transmission rates, an 896-character receive/print buffer and X-on/X-off control characters for transmission to and from the host CPU.

A parallel interface option linking the AJ 841 with any S-100 bus microcomputer is also available, the firm stated.

Based in part on the IBM 745 terminal mechanism, the AJ 841 can be used on-line to a CPU or off-line as a typewriter, the firm noted. Both parallel and serial versions of the terminal are offered.

With a 30-day consumer parts and labor warranty, the AJ 841 with the RS-232 interface costs $995 from AJ at 521 Charcot Ave., San Jose, Calif. 95131.

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Smap Keeps Smelter Plant Productive

Special to CW

SALT LAKE CITY — Computers are playing a vital role in performing maintenance and keeping down costs for a $280 million smelter facility recently opened here by the Utah Copper Division of Kennecott Copper Corp.

The company's mainframe stores key information about the maintenance of the equipment in the plant, which uses process control computers, pollution control equipment and other types of instrumentation.

In order to perform maintenance functions effectively, large volumes of data are needed on a timely basis about such things as equipment specifications, performance and history. In the past, this data was made available in the form of voluminous computer printouts that were periodically replaced by updated editions.

However, the company's Metal Mining Division computer center, working with smelter personnel, has implemented a system that provides all smelter personnel with instant access to this information via CRTs located throughout the repair area.

Design Requirements

The on-line system, called the Smelter Maintenance Assist Program (Smap), was designed to meet the following requirements:

- Provide orderly procedures for planning and control.
- Optimize the use of maintenance resources
- Coordinate support services
- Capture organized data in a relevant presentation
- Provide rapid and easy accessibility to maintenance information.
- Display performance and repair costs of equipment and manpower effectiveness.
- Minimize paperwork.
- Be capable of operation by all levels of maintenance personnel.
- Be simple to use and be understood by all levels within the organization.

The key to the usefulness and success of the system is the CRTs that eliminate the need for the printouts. Ten IBM 3277 CRT terminals, attached to the company's 370/158 and located in various places throughout the smelter, permit timely access to needed information.

The 370 also runs approximately 200 other applications that support administrative, financial, production and technical groups within the Metal Mining Division.

"This is a capital-intensive industry, and maintenance costs are a significant portion of our total smelter operating costs. Ready availability of information via the terminals will allow our maintenance staff to operate in a more cost effective manner," according to R.J. Anderson, superintendent of the smelter plant.

Small Upkeep Increase

"We estimate that the maintenance demands in the modified plant will increase by 35% over that of the old smelter," J.L. Hansen, the plant's maintenance superintendent, said. "Yet maintenance manning will increase by only 3.2%. This increase in productivity is partly a result of our use of Smap."

"From my point of view," Hansen said, "one of the system's biggest benefits is that it gets information into the hands of people who can act on it. Previously the information was available, but it was in a variety of locations and cumbersome to obtain; line personnel often didn't have time to search it out.

"Thus, without all the pertinent facts, they were forced to make intuitive or 'best guess' decisions. Now the needed information is available at the push of the button."

(Continued on Page 82)

Tunable Dye Laser May Prove Aid as Data Storage Method

SAN JOSE, Calif. — Four scientists at IBM's San Jose Research Laboratory have been awarded a patent for a tunable dye laser that may have future application to optical storage of data.

The patent, entitled "Frequency Selective Optical Data Storage System," was granted to George Castro, Dietrich Haarer, Roger Macfarlane and Peter Trommsdorff and is based on a photochemical process called "hole burning." The technique is a unique method for increasing the amount of data that can be packed into a given space, according to IBM.

In the system described by U.S. patent 4,101,976, each bit is identified by its location in the frequency spectrum as well as by its location in two- or three-dimensional space. Using the technique, hundreds or even thousands of the "frequency-coded" bits could be stored in a single, microscopically small region of space. The size of this region could be as small as 1/25,000 in., or one micrometer, which is the diffraction limit of a laser beam.

One possible implementation of the storage system described in the patent would be to deposit an array of tiny blocks or elements of storage material on a supporting structure. Given elements one micrometer in diameter, closely packed together, element density would be 100 million per square centimeter. With 1,000 bits stored in each el-

(Continued on Page 80)

MIC Report Makes Suggestions On 'People Side of Data Entry'

By a CW Staff Writer

CHERRY HILL, N.J. — Motivation of senior employees and data entry operators, communications among employees and proper support from top management are some of the major areas of concern to data entry managers and supervisors, according to a report recently issued here by Management Information Corp. (MIC).

The report, "The People Side of Data Entry," represents a consolidation of two years' worth of reports from the company's publications, *Data Entry Awareness Reports*, as well as experience at recent MIC seminars, according to a company spokesman.

Other areas of concern pinpointed by the report were productivity and operator training, control of the quality and timeliness of user department input and the problems encountered by management with union shops, including unionized employees in both the private and government sectors.

Productivity issues and proper support from top management were also high on the list of troublesome areas for data entry managers, MIC said.

Data Entry Dimensions

"It is through motivation that success is achieved," the report noted, adding that the data entry manager must himself be motivated before he can expect to motivate any of his employees.

"My boss does not motivate me, so how

(Continued on Page 78)

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Report Focuses on 'People Side of Data Entry'

(Continued from Page 77)

can I motivate my people?" is an excuse for motivation and does not qualify as a reason for poor motivation, according to the report.

Motivation vs. Manipulation

An important distinction must be made between motivating employees and manipulating them, the report pointed out. Manipulation is finding ways to get people to do what the manager wants them to do, whereas motivation is finding ways to get people to *want to do* what the manager wants them to do.

According to MIC, the significance of the distinction is twofold: manipulation has a poor connotation in our society, and motivation requires mutual respect as well as understanding of the needs of employees in the department and of the needs of the company vis-a-vis the particular department.

One of the areas in which motivational skills can be applied is employee acceptance of new equipment. Several actions by the data entry manager can pave the way for employees' accepting changes in equipment.

This includes the manager or supervisor assuring employees they will not lose their jobs and making the arrival of the equipment an event to look forward to, for example, by planning a party for that day.

"When handled with foresight, change can bring a marvelous new energy to the department," the report observed.

Turning to the area of boredom, the 38-page report discerned several methods for stimulating interest and reducing absenteeism. Among these are games, rotation, daily progress reports and music.

Discussing its own experience, MIC said "we found that Western country music with its fast tempo enhanced the rhythm in the room, and we turned it on whenever we sensed a low energy point."

Awards Made

Awards of $10 to the fastest and to the most accurate operator, made in front of all the operators and with appropriate speeches and applause, also helped lessen boredom, the company said.

Summarizing experience in this area, the report noted that "variety can be found in many ways if you use your imagination. Data entry is an exciting profession, and the work has many rewards if we allow it to [sic]."

Productivity Improvement

Several months of improving productivity are also discussed by the MIC report.

Key among these are for the data entry manager to expect greater productivity, to visualize in his mind that the operators are improving daily, to talk to the operators about this improvement and to tell the operators what is expected.

Reporting to the operators periodically how their work is improving and, if possible, meeting with each once a week is also recommended, as is the adoption of a positive, encouraging attitude.

It is best not to be negative with an operator when he has some bad days, since these happen to everyone, the report remarked.

Flexitime Urged

An additional method for bringing out the capabilities of data entry employees, as well as systems analysts, programmers and operations personnel is to adopt variable work hours. Although productivity gains of 1% to 5% are common following the adoption of such plans (commonly called "flexitime"), such increases cannot be clearly tied to the use of the system, MIC said.

Nevertheless, the company benefits at both ends of the day with no wasted hours, and employees can work during the times when they perform at their best.

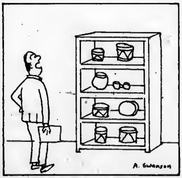
Workers become job-oriented rather than time-oriented because time becomes an element the worker can control, the report suggested.

"While flexitime works very well in applications such as systems analysis, programming and data entry, most companies find that other systems are required for the operations department.

Flexitime cannot work in an environment that requires considerable contact with outside departments or with employees who require constant supervision," the report noted.

In addition, it is essential that employees be able to undertake each other's tasks when converting to flexitime.

Copies of the report are available for $15 each from MIC at 140 Barclay Center, Cherry Hill, N.J. 08034.



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Laser May Be Storage Aid

(Continued from Page 77)

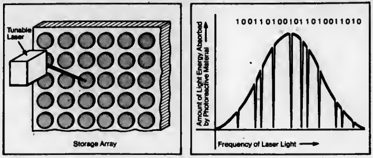
ement, 10^{15} bits — estimated to be the total storage capacity of the human brain — could fit in about one square meter of area.

Work on the new storage technique is still at a very early stage of research. "We have a long way to go before this can be made into a technology," according to Dr. George Castro, manager of the San Jose laboratory's physical science department. "So far we are investigating a variety of potential storage materials and trying to understand the temperature limitations of the phenomena. We still have to address the many unsolved problems that have prevented other optical methods of storage from becoming technologies.

"In fact, optical methods of storing information were expected to lose an important advantage, namely that of high storage density, as the storage densities in the existing magnetic recording technologies approach optical limits in the next decade. Hole burning breathes new life into optical storage by theoretically extending that density a few orders of magnitude," he said.

The invention depends on the use of a laser that can be tuned — similar to adjusting the station selector on a radio — so that it emits light of various colors, but whose light rays at a particular setting of the dial all oscillate within an extremely narrow frequency band. The tunable dye laser is itself an IBM invention.

The highly monochromatic light from such a laser is directed onto a sample of a photoreactive material that is cooled to a few degrees above absolute zero. This action produces a chemical change in a very small percentage of the material's molecules — just those whose spatial environment enables them to absorb energy at the frequency of the laser light.



One possible implementation of the laser technique is an array of tiny blocks of photoreactive material. By varying the direction of a laser beam pointed at the array, it is possible to select the spatial "addresses" of these blocks. By varying the frequency of the laser light, it is also possible to address many different groups of molecules within these blocks.

As a result of the chemical reaction, the frequency-selected molecules are changed into a new compound and none of the original molecules are then left to absorb light at the frequency that produced the reaction. The phenomenon is observed as the forming of a gap, or "hole," in one of the material's optical absorption peaks — hence, the name "hole burning."

In experiments performed to test the feasibility of the hole-burning technique for data storage, the IBM scientists were able to burn a hole whose width (in frequency units) was less than one thousandth the width of the absorption peak in which it appeared — one of the narrowest optical features ever observed in a solid.

By implication, the peak is wide enough with respect to the laser frequency to allow burning of one thousand holes side by side. This could be done sequentially simply by tuning the laser beam to one thousand different colors, or frequencies.

The "ones" and "zeros" by which information is encoded in a computer could then be represented by the presence or absence of holes in the absorption peak at particular frequencies.

DEI Unveils Data Converter

ESCONDIDO, Calif. — A field-programmable asynchronous-to-synchronous converter capable of operational data rates to 19.2K bit/sec has been introduced by DEI Teleproducts Division here.

The Model BDS (binary digital synchronizer) is available as a self-powered, stand-alone unit or as a multistation, rack-mounted device. It connects in series between the RS-232C interface of an asynchronous terminal and the digital I/O of a synchronous modem, compensating for the speed differential between the two devices and allowing true start/stop asynchronous data to be transmitted through a synchronous modem, a spokesman claimed.

The unit operates at 2,400-, 4,800-, 9,600- and 19,200 bit/sec, acording to a spokesman, and can accommodate five, six, seven or eight data bits and one, 1-1/2 or two stop bits. The unit accepts odd, even or no parity, the spokesman added, and other data rates are optionally available. Four diagnostic LEDs show traffic and error status, which aid in rapid system fault isolation..

The unit is priced at $300 in single quantities, a spokesman said from 563 N. Citracado Pkwy., Escondido, Calif. 92025.

Tools of a master craftsman

In your data shop - - just as in a woodcraftsman's workshop - - tools make the master. The proper tools enhance the craftsman's skill, enabling him to achieve the highest potential of his craft. The best tools likewise help you effectively manage your DP shop. So it's essential you select tools of trade proven for excellence. From among Gulf Computer Sciences' shop-tested line of utilities.

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20M-Byte Drive Introduced

Data 100 Caps High End of Printer, Disk Lines

MINNEAPOLIS — Data 100 Corp. has capped the top ends of two of its product lines, introducing a 900 line/-min printer and a 20M-byte disk drive.

The Model 5590 printer features an operator-changeable character cartridge for multiple fonts, built-in maintenance and diagnostic routines, an LED display that reports the internal status of the printer and a universal power supply said to be compatible with the power requirements of most OEMs.

Standard features also include spacing of 6 or 8 line/in., 132 print positions, a 64-character Ascii code set and a Data 100 standard parallel interface. Standard pin-feed forms up to 18 in. wide can be printed with the unit, the spokesman said.

Optional features include 136 print positions, 48-, 96- or 128-character Ascii or Ebcdic cartridge, and an operating time meter.

Also available as options are 2-, 8- or 12-channel or direct-access electronic vertical forms unit control; static eliminator; special interfaces compatible with other printer models; and a voltage monitor.

In quantities of 100, the Model 5590 sells for $8,940 as a floor cabinet model or $9,240 housed in an acoustical cabinet.

Disk Drive

The 20M-byte disk drive introduced by the company, the Model 4406 combines a top-loading disk cartridge and a fixed disk on a common spindle. Both disks are served by the same access mechanism with one magnetic head per disk surface, the spokesman said.

The disk drive operates at 200 track/-in. and 4,400 bit/in., with a 2,400 rev/-min spindle speed. Access time is 20 msec track-to-track, with an average of 45 msec for a random move.

An optional high-speed actuator can improve access time by 15 msec for track-to-track movement, the spokesman noted.

The Model 4406 is priced at $3,387 in quantities of 100. First deliveries are set for the first quarter of 1979, the spokesman said from 6100 Blue Circle Drive, Minneapolis, Minn. 55435.

Vendors Offering Books to Users

Several vendors have announced the availability of literature that may be of interest to DPers.

- Datapro Research Corp. is offering a 189-page *Datapro Directory of Suppliers* containing profiles of 925 companies that supply all types of products and services of interest to computer users.

The $15 publication, which has been reprinted from *Datapro 70*, another of the company's publications, was designed to help DP management choose suitably qualified vendors by including data about each company's product line, financial status, size, management and sales and service organization.

The publication is available from the company at 1805 Underwood Blvd., Delran, N.J. 08075.

- A 28-page brochure from Versatec, Inc. discusses applications and specifications of the 47 printers, plotters, and printer/plotters sold by the company.

The 28-page brochure is said to describe the advantages, applications and specifications for the devices and also covers computer output devices such as the company's vector-to-raster converter, remote spooling vector processor and I/O multiplexer series.

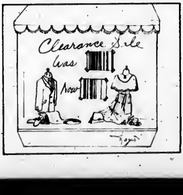
Included in the brochure are the devices' key specifications such as resolution, speed, width, col/line, character sets, font dot matrix dimensions and standard font availabilities, as well as printed samples of various type fonts to allow comparison of print detail.

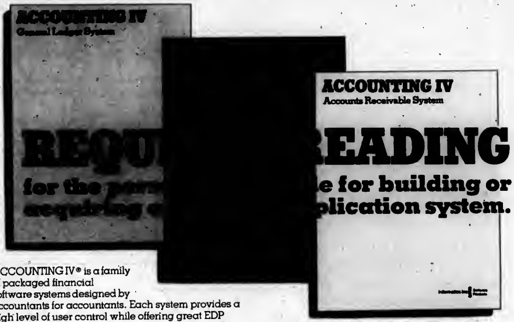
The booklet is available free from the company at 2805 Bowers Ave., Santa Clara, Calif. 95051.

- Texas Instruments, Inc. is offering two books, *Understanding Calculator Math* and *Understanding Digital Electronics*. Priced at $3.95 each, they represent the first of a planned "Understanding Series" of electronics books from the company.

Understanding Calculator Math covers the information, formulas, facts and mathematical tools needed to use a calculator more effectively, according to the company, while *Understanding Digital Electronics* explains how the digital system, electronic devices and circuits work.

The books are available from the company through P.O. Box 3640, Mail Station 84, Dallas, Texas 75285.





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On-Line System Keeps Smelter Plant at Work

(Continued from Page 77)

"Another problem," Hansen noted, "is that experienced maintenance people acquire unique equipment knowledge which they carry around with them in their head or in a pocket notebook. If the supervisor was not on-site and a piece of equipment developed a problem, the knowledge required to resolve the problem often was also absent. Smap provides a central point for maintaining that kind of information."

Cross-Referenced Data

Using the CRTs, maintenance employees enter the following types of information in the system: equipment specifications, maintenance requirements, job requests, failure reasons, labor estimates, material estimates, job priorities and jobs completed.

Labor and material charges are entered into the computer from existing comptroller systems. This information then can be displayed on the CRT screens; printed copies of the display output are available upon request from preselected units.

The Smap data base identifies all pieces of smelter equipment by equipment, functional account, material and supply inventory, specifications, drawing and original purchase order numbers. Spare parts listings for each piece of equipment are maintained in the files, in addition to preventive maintenance requirements, schedules and complete specifications.

A versatile cross-referencing concept was designed into the system so all information regarding a piece of equipment can be retrieved even if only one of the identifying numbers of the type of equipment is known.

Terminal inquiry into the system, currently about 2,000 entries per week, is readily understandable so special training is not necessary for the user. Updating of the data base (other than information entered by nonmaintenance departments) is accomplished at a single location within the maintenance department; updated data is then available immediately through inquiry.

Estimating time, material and crafts for work orders is often faster and more accurate because of the scheduler's rapid access to equipment history, work orders, specifications and inventory information, Hansen said, and jobs can be scheduled with the assurance that needed parts are available.

"Parts procurement used to be one of our biggest problems," Hansen recalled. Smap can provide immediate access to data about the 14,800 items in the smelter warehouse and the 60,000 items in warehouses in other division warehouses.

According to Hansen, "Rapid and accurate inventory information will help us set more realistic stockpile levels. I think this will ultimately help us reduce our physical inventory and warehousing costs.

"In order to achieve equipment availability standards (determined by smelter operations personnel) and still keep costs down, maintenance is performed in a detection-oriented mode," he added. "We try to detect problems before they become major, through an aggressive inspection and lubrication program.

"Unscheduled outages are very expensive and they must be kept to a minimum. I anticipate that Smap will be instrumental in helping us improve the equipment availability over the long run.

"At this time it's hard to put a tangible value on the benefits of Smap since maintenance costs in the modified plant are still questionable and we still haven't realized the full impact of the benefits of the system. But with it, we are potentially capable of coping with any problem that might arise," Hansen said.

"The system is flexible and dynamic and can and will continue to expand and change as we identify new needs," he concluded.

R.K. Davey, DP manager for the division, estimated it will take a year or two to build up a data base that would be valid for trend analysis, but said historical cost and maintenance data should prove useful within the year for planning, budgeting and crew scheduling purposes.

In any case, however, the time formerly spent searching out data will be better used, he added.

"We have made a major capital investment in our modified smelter and have taken advantage of what is a rare opportunity in this business. We'll start this modified facility with a comprehensive and effective maintenance support program," Davey said.

"In addition, while the creation of Smap was spurred by the needs of the modified smelter, the system is designed so that it can be used by the maintenance departments in all Kennecott divisions," he pointed out.

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Here's a *tailor-made* system to fit the requirements of your job today. In addition, BRAEGEN's multi-tasking intelligent controller offers the flexibility you will require in the future. **Systems Programmers,** in particular, find the following features very valuable.

Both Local and Remote 3270 are available, of course,

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Local Job Entry. Line printers up to 1200 LPM with 1403 addresses and card readers with 2501 addresses can be placed next to any BRAEGEN CRT. These "hot" printers and readers are located in the users' areas up to 7,500 feet outside the computer room. Most popular uses are for programmer listings and accounting work. Users get the benefits of increased productivity because turnaround time is reduced to minutes.

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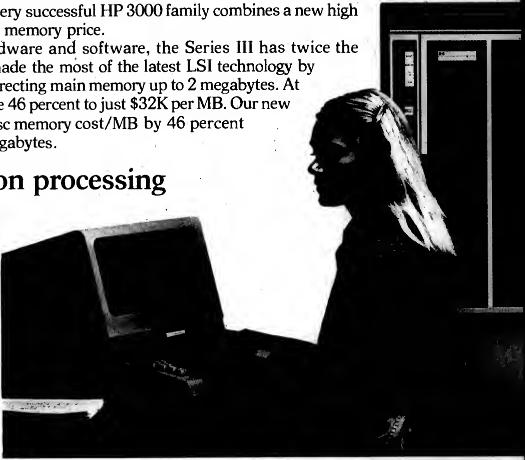


The latest addition to our very successful HP 3000 family combines a new high in performance with a new low in memory price.

With more powerful hardware and software, the Series III has twice the throughput of the Series II. We made the most of the latest LSI technology by using 16K RAMs to offer error-correcting main memory up to 2 megabytes. At the same time, we dropped its price 46 percent to just $32K per MB. Our new optional 120 MB disc also cuts disc memory cost/MB by 46 percent and increases storage to 960 megabytes.

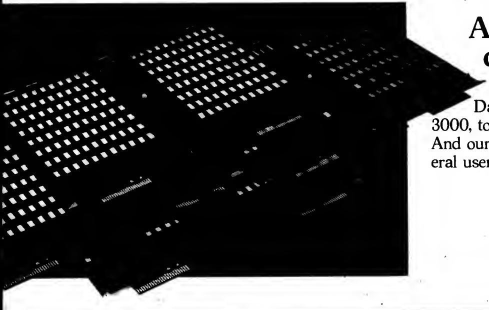
On-line transaction processing made easier.

So more people can get more out of the system at the same time, we speeded up our operating system. With the help of our latest Multiprogramming Executive, MPE III, people at dozens of terminals can simultaneously enter and update the data base, develop programs or solve problems. And they can use any of six languages, too.

In addition, you can either handle a wide variety of different jobs or dedicate the system to single high-volume tasks—without changing operating software!

MPE III also gives you some features previously found only on expensive mainframes. Multipoint terminal support is one. You can cut your communications costs substantially by hooking up a string of terminals on a single cable, with a 9600 baud line speed.

Private volume disc files is another asset. A set of commands allows you to interchange disc volumes without powering down and reconfiguring the system.



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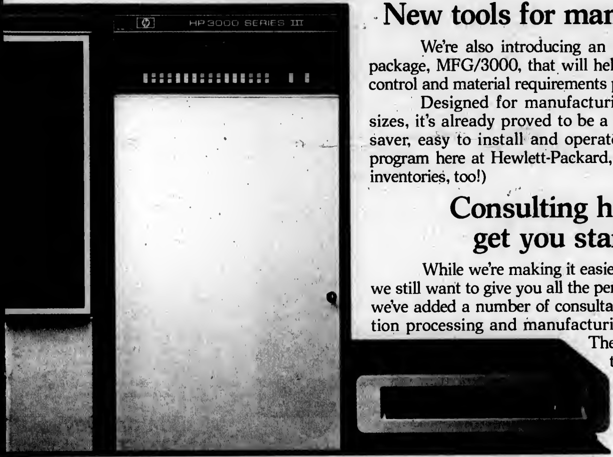
We've improved our award-winning Data Base Management scheme, IMAGE/3000, to make it operate about 20 percent faster. And our new associative locking scheme lets several users update the data base at the same time.

3000 Series III.



A new feature of DS/3000, our networking software, gives you easy access to remote data bases. For a large company, this can obviously lead to a much more efficient distribution of data, as well as making management information even more speedily available than before.

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We're also introducing an applications software package, MFG/3000, that will help shape up inventory control and material requirements planning.

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Consulting help to get you started.

While we're making it easier to use the HP 3000, we still want to give you all the personal help we can. So we've added a number of consultants in on-line transaction processing and manufacturing to our field force. They'll help you through the critical first phase of planning and installation.

With all these advantages, and system prices starting at $115,000, don't you owe yourself a closer look? Call your nearest HP office listed in the White Pages and ask about a hands-on demonstration of the powerful Series III, the new head of HP's business systems family. Or write to Hewlett-Packard, Attn: Bill Krause, Dept. 329, 11000 Wolfe Road, Cupertino CA 95014.

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Fixed-Disk Substitute Gives Faster Response

PLANTATION, Fla. — Digital Data Systems, Inc. has introduced a core storage system designed to replace any fixed-head disks and improve response time for the data on the device.

The Megacore has a capacity of 512K to 4M bytes; it is expandable in 512K-byte increments, according to a spokesman.

Word length for the system is 16 bits, with a maximum access time of 2.5 microsec. Maximum transfer rate for the device is 1M byte/sec, he added.

Expense Offset

Although the device is somewhat more expensive than an equivalent amount of fixed-head disk storage, this is offset by several factors inherent in the nature of the product, the spokesman said.

He cited the ability to use the device in a less stringent environment than that required for disks, the Megacore's greater speed and its greater reliability, which he attributed to the fact the memory uses no moving parts.

The Megacore operates in sector/subsector read and sector write modes; it performs its own internal parity generation and checking. Write protection is also featured.

The unit can be attached to any host mainframe through custom interfaces supplied by the company, the spokesman said.

The Megacore sells for approximately $12,000 per 512K bytes, depending on the interface desired, from the company at 1396 N.W. 65th Terrace, Plantation, Fla. 33313.

Time Device Clocks Hours

SACRAMENTO, Calif. — A computerized data collection device said to eliminate several manual steps in recording employee hours worked has been introduced by Computer Hardware, Inc.

The Time Machine accepts a plastic identification badge to identify the employee, record hours worked and prepare the collected data for direct input into a computer.

Input can be either direct to a host computer or via an internal cassette that can hold up to 5,000 transactions or 130,000 characters, according to a spokesman. A self-contained printer in the device provides a hard-copy record to comply with federal and union regulations.

The machine — said to eliminate manual timecard processing — is particularly suitable for companies with more than 100 employees, the spokesman said.

A companion feature of the system is an identification card program that can be used to monitor project work, he noted.

The machine costs $2,295 and is being sold through a national network of distributor dealers, the company said from 4111 N. Freeway Blvd., Sacramento, Calif. 95834.

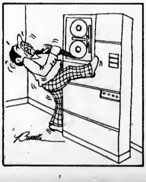
Halon Device Hand-Usable

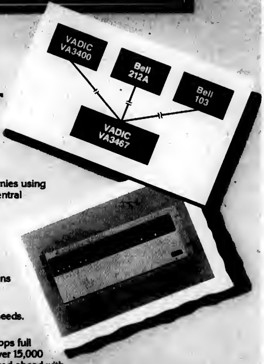
NEW YORK — A portable hand-operated fire extinguisher containing Halon 1211 has been introduced by the Data Supplies Division of Printcraft Systems, Inc.

The extinguisher, which uses the same substance used in centralized, high-pressure, computer-room extinguishing systems, is available in two sizes.

The extinguisher has been approved by the Coast Guard, Department of Transportation and Underwriters Laboratories, according to a spokesman.

The Model 75013 with 2.75 lb of Halon sells for $59.80, and the 5-lb Model 75014 sells for $89.90 from the company at 11-17 Beach St., New York, N.Y. 10013.





Dear Ma:

The crystal ball is right. Vadic's new microprocessor modem is a VA3400, a 212A, and a 103!

Imagine, Ma, a modem that time sharing houses, and companies using dial-up lines for data communications, can standardize on at the central computer site. With a single phone number for all asynchronous ports from 0 to 1200 bps, if desired.

By ingeniously building in a microprocessor, Vadic's new VA3467 automatically recognizes the calling modem, be it a VA3400, a 212A or a 103, and responds accordingly. All this on a PC board including direct connect (no need to rent your DAA's) for $850 or less! The VA3467 even tests itself continuously, plus contains all of Vadic's famous diagnostics.

The VA3467 is field expandable, too. You can start with just a VA3400 and later add the 103 or 212A depending on your network needs. That's what firmware does for you.

You just can't seem to catch up, Ma. Vadic invented the 1200 bps full duplex modem (the VA3400) 'way back in 1973, and has delivered over 15,000 to more than 1,000 customers worldwide. Now, Vadic has leapfrogged ahead with the TRIPLE modem. By the way, Ma, Vadic has just published a booklet comparing the VA3400 to the 212A in 14 critical areas. Better send for one. It's free.

Your independent thinking son,

Alexander Graham Jr.

PS: Vadic has shipped over 150,000 modems to date.

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Device Converts Text to Machine-Usable Form

CAMBRIDGE, Mass. — Kurzweil Computer Products, Inc. has introduced a system capable of converting printed text to machine-processable form. The Kurzweil Data Entry Machine (KDEM) is an outgrowth of the company's Reading Machine.

The machine can scan and convert to machine-readable form any type of printed source documents, according to the company, including typed, typeset, printed or photocopied material. It uses the "omni-font" recognition technique developed by the company and used in the Reading Machine. That device, presently in use in approximately 35 installations, converts printed material into recognizable speech for the visually handicapped.

The system can convert print in any font or combination of fonts at a rate of approximately 30 char./sec, a spokesman said, with an error rate as low as one in 20,000 characters. At this rate, a 300-page book could be converted to digital form in approximately six hours, as opposed to the 40 to 50 hours that would be required by key entry, the spokesman added.

Uses for the system suggested by the company include the conversion of government and corporate manuals or documents such as contracts and journal articles.

The company plans to adapt the system for use in automated typesetting, an area which has presented problems in flexibility and updating when large sections of text are revised or newly incorporated.

Scanner 'reads' printed test.

Operator verifies ambiguous letters.

The standard system configuration includes a print scanner for inputting the material, a disk drive for storage of intermediate and final files and a compatible tape drive for final storage and portability. Also included is a CRT for operator use, particularly when the system has difficulty discriminating a character.

The system is priced at about $100,000, Kurzweil said from the company at 264 Third St., Cambridge, Mass. 02142.

Printer Suited For Order Entry

SAN ANTONIO, Texas — Datapoint Corp. has unveiled an extension to its Freedom Printer family featuring a dual, separately controlled paper feed and a choice of keyboard formats.

The keyboard-send-receive (KSR) printer features separately controlled forms tractors that permit simultaneous printing of two kinds of forms and allow a variety of communications rates, according to the company. It is expected to be particularly useful in order entry applications.

Also featured on the printer is a last-character visibility feature that moves the carriage mechanism 10 spaces to the right after printing or typing ceases for a short time. The feature helps reduce errors by making visible to the operator the last bit of data sent or received, according to a spokesman.

Two versions, 80- or 160 char./sec, print at rates from 25- to 425 line/sec, depending on line length. The 5 by 7 dot matrix printer uses a 96-char. Ascii set to print a maximum line width of 132 characters on fan fold, sprocket-fed forms, and an original and five carbons can be produced.

Communication Features

Using either a keypunch-like keyboard or a standard Datapoint 3600 Datastation keyboard with 76 key positions, the unit becomes a full-duplex send-receive terminal, according to the company, and can communicate with a host processor up to 1,000 feet away over a simple twisted-pair of telephone lines or over longer distances via modems, the spokesman added.

Transmission rates vary from 18.6 bit/sec to 9,600 bit/sec selectable from the device, a spokesman said, adding that the unit is capable of full duplex operation. An RS-232C interface is also available.

The 160 char./sec KSR Freedom Printer sells for $4,895 or leases for $165/mo on a three-year basis, with a maintenance charge of $55/mo. The 80 char./sec printer costs $4,395 or leases for $150/mo (three-year lease) with $40 monthly maintenance, a spokesman said from 9725 Datapoint Drive, San Antonio, Texas 78284.

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Order Turnaround Slashed

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HARRISON, Ark. — "Electronic ordering has changed our operation from beginning to end, with a very positive effect in every area," according to Leo Riggs, executive vice-president of Mass Merchandisers, Inc.

Riggs described what automated ordering has done for his company, which sets up and maintains racks of nonfood items in markets and other retail outlets in 15 southeastern and central states.

By the mid-1970s, Mass Merchandisers had sales of $50 million a year and management was proud of the company's growth and profitability. However, "we knew there is always room for improvement, and electronic ordering seemed to be the wave of the future," Riggs recalled.

To get into electronic ordering, the company looked at several systems, finally settling on the Source 2100 shoulder-slung portable data entry terminal made by MSI Data Corp. of Costa Mesa, Calif. Eventually, it ordered 125 of the units for its 200 field sales representatives.

Shortly after the firm began using the devices, "sales increased, overhead declined and we could get orders to our customers more quickly and efficiently than before," Riggs noted. As a result, the company subsequently purchased an advanced version of the system, the Source 2200.

Before Mass Merchandisers began using the device, salesmen delivering and stacking merchandise kept separate order books for each customer. Completed books were delivered to local "mini warehouses" for subsequent delivery to company headquarters here, where the data was prepared for input to the company's IBM 370/135: The 135 then produced picking documents, invoices and delivery logs, which accompanied the outbound goods to the local mini-warehouses.

Using the system, the salesmen can transmit orders over phones on customers' premises. As a result, lead time between placing an order and its arrival at the data preparation department has been cut, so the interval between order entry and delivery is shorter.

Overnight Turnaround

"Our turnaround time used to be four or five days," Riggs noted, but now, "if we receive an order at night, we can ship it the next morning." In addition, the company's delivery trucks are more productive, since they need no longer make the trip between the field and headquarters merely to deliver documents. This has meant an expansion of the company's marketing area, since the trucks can now cover more territory.

To take advantage of the scanner wand feature of the MSI terminal, the company adopted a new order guide that lists each of the 6,000 items it stocks with bar codes beside each item. To enter a restocking order, the salesman scans the bar code and the terminal registers an order for the suggested minimum quantity. This is only a suggestion, however, and can be overridden by the salesman.

The results at company headquarters have also been impressive. The key entry of orders — and the overtime for this operation — have been eliminated, and the accuracy of orders has been improved significantly. Overtime for warehouse crews has also been sharply reduced under the system, since they need no longer wait — unproductively — if the trucks containing the delivery orders are delayed.

Although the salesmen were "wary at first," Riggs noted, they came to accept the system after they saw it would in fact work and that they retained control of their orders.

The salesmen are also pleased in other ways. Now the need not drive to the mini-warehouse every night to drop off orders, thus saving on their expenses. "This system has cut the salesmen's ordering time in half," Riggs observed.

Finally, customers are also benefiting from the system. "When we get a new customer, the salesman can order today and deliver the merchandise the next day, even when it's a huge order. They're really impressed," Riggs said.

IBM 1800 Users Get High-Speed Printer

ELKIN, N.C. — A plug-compatible printer for IBM 1800 users is being offered by Technic Engineering. That unit prints at an average 180 char./sec, thereby freeing substantial computer memory for those users.

The Techprint I printer, based on the Digital Equipment Corp. LA180 printer, has a transfer rate of 250 char./sec and an interface package that allows it to communicate with the host. The printer can also operate with the IBM System 7 and 1130 systems, according to the company.

A companion CRT provides high-speed auto scrolling of 24 lines at 80 characters each and presents process operating information continuously at input rates up to 1,000 char./sec.

The Techprint I sells for $5,850 with quantity discounts available. Technic can be reached through P.O. Box 429, Elkin, N.C. 28621.

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Mini Bits

Sycor Decreases Prices Of Three System Models

ANN ARBOR, Mich. — Sycor, Inc. has cut the prices of three models in its 400 family of distributed data entry and processing systems.

Prices of the firm's top-of-the-line 445 and entry-level 405 distributed processing systems have been trimmed 20%, while the price of the Model 440 has dropped 14%, according to Sycor spokesmen.

With the price cuts, which become effective immediately, a 64K-byte 445 system incorporating a 5M-byte disk system, 5M-byte tape unit, four data stations, a Sprinter printer and a communications adapter costs $42,380.

A 48K-byte 405 system incorporating a 500K-byte floppy disk unit, a data station, Sprinter printer and communications adapter now costs $16,440.

A 64K-byte system with a 5M-byte disk unit, four data stations, a Sprinter printer, diskette interchange media and communications adapter costs $33,640.

Sycor will continue to lease the three systems under one-, two- and four-year plans, according to company officials at 100 Phoenix Drive, Ann Arbor, Mich. 48104.

Single-Board Disk Controller Plugs Into DEC LSI-11/02 Micros

BURLINGTON, Mass. — A hard disk controller packaged on one dual-width printed circuit board plugs into the Q bus I/O backplane slot of any Digital Equipment Corp. LSI-11/02 microcomputer, according to spokesmen for Xylogics, Inc., the controller's developer.

With a 2.5M-byte or 5M-byte disk unit that uses 100 track/in. recording media, the Wizard I reportedly forms a subsystem that is hardware-, software- and media-compatible with DEC RK11/RK05 disk subsystems.

Wizard I provides a read-only memory bootstrap loader, cable to the first drive unit and on-line self-test capability, and it operates with 5 Vdc plus or minus 5%, 3 A, supplied by the host computer, Xylogics officials said.

Although it accommodates up to 20M bytes, the microprocessor-based controller also supports 2.5M-, 5M- and 10M-byte disk units in any configuration of fixed or removable media, they added.

Wizard I costs $2,495 with OEM discounts available from Xylogics at 42 Third Ave., Burlington, Mass. 01803.

System Lets Plains Town Feel 'On Top of World'

By Jeffry Beeler
CW Staff

HILL CITY, Kan. — Officials in this seemingly misnamed Great Plains town feel "on top of the world" — figuratively, if not literally — after installing a small business system to automate their municipal accounting functions.

Since the system became operational a little more than 17 months ago, this rural northwestern Kansas community, which owes its name to its founder rather than to the character of the surrounding terrain, has streamlined the execution of three of its most important business and financial tasks.

Utility billing, which typically took 10 days to perform before the system arrived, now takes seven days, according to city clerk Jon Hanna.

The city payroll, which used to require two days to generate, can now be done in less than a day and a half.

And accounts payable now takes about six hours, compared with three days with the community's earlier accounting system, Hanna added.

Before it installed the current business system, the town (with a population of 2,300) produced its utility billings with the help of an NCR Corp. posting machine and performed the other two functions without any mechanical or electronic aids.

To generate local residents' electricity bills, for example, Hanna and his staff referred to a prepared chart that allowed them to determine each customer's charge based on the individuals power consumption during the most recent billing periods.

After personnel in the city clerk's office

(Continued on Page 96)

Stand-Alone Systems Debut As Service Firm's Offerings

By Jeffry Beeler
CW Staff

BLUE BELL, Pa. — Another DP services firm made its debut as a hardware vendor recently when NLT Computer Services Corp. complemented its on-line systems family with its first series of stand-alone minicomputer configurations.

Unlike Automatic Data Processing, Inc., Keydata Corp., National CSS, Inc. and other services firms that have diversified recently by introducing stand-alone systems, NLT will aim its latest offerings exclusively at the wholesale distribution industry.

This emphasis on wholesale distributors distinguishes the NLT stand-alone systems from their counterparts at other service firms and provides the systems with their chief competitive edge over their less specialized rivals, according to an NLT spokesman.

In addition, the stand-alone systems use the same software NLT has provided for nine years as part of its on-line services network, the official added.

(Continued on Page 90)

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Services Firm Debuts as Hardware Supplier

(Continued from Page 89)

Dubbed the System V series, NLT's latest hardware offerings come in four basic configurations that differ primarily in disk storage capacity.

The configurations — designated the models 100, 400, 800 and 1600 — support 10M-, 40M-, 80M-, and 160M-bytes of disk storage, respectively, the spokesman said. In addition, NLT offers the Model 200, a dual-disk version of the Model 100 with a mass storage capacity of 20M bytes.

Seven Systems

Together, the four System V models form the stand-alone portion of a line of seven NLT minicomputer systems known collectively as the First Family.

Unlike the computer services firm's latest product introductions, the other three First Family members belong to NLT's series of on-line processing systems. All three models reportedly operate as part of a time-sharing network controlled by the firm's host mainframes at its six regional DP centers.

Two of the on-line systems — models 10 and 20 — consist basically of an intelligent CRT terminal and a line printer connected to a remote Data General Corp. Nova-3 minicomputer. In a typical Model 10 or 20 application, the CRT terminal and printer operate in a distributor's remote warehouse, while the minicomputer controls their functions from the user's central office, the spokesman explained.

With the other NLT on-line system — the Model 30 — the Nova-3, CRT unit and printer operate at the same site and perform "intelligent terminal type" activities like formatting and communications control, he added.

But because all seven members of the First Family are hardware- and software-compatible with each other, users can upgrade from an on-line Model 30 to a Model 100 or other stand-alone system merely by adding increased disk capacity, a faster printer and some communications hardware, the official explained.

Moreover, all four stand-alone models can reportedly double as on-line systems through the addition of a tape drive unit, which interfaces the System V hardware to NLT's time-sharing mainframes. This on-line computing option helps users of the stand-alone systems perform otherwise unmanageable DP workloads like month-end processing.

Like the three on-line systems, all four stand-alone models incorporate a Nova-3 with 65K bytes of core memory expandable to 256K bytes.

In a typical configuration, all four System V models also incorporate the same number and type of peripherals except for disk units. A standard Model 100, 400, 800 or 1600 system includes four CRT terminals and a 300 line/min printer, the NLT official said.

With each stand-alone model, however, users can expand that configuration to incorporate as many as four CRT terminals, four tape systems and four 300 line/min printers, he added.

In addition, the Model 1600 can reportedly accept two additional 800M-byte disk units to double its mass storage capacity to a total of 320M bytes.

Each of the stand-alone NLT models supports the Minicomputer Systems, Inc. Micos operating system, which accommodates extended Basic.

Applications software available with the First Family includes packages for billing, accounts receivable, accounts payable, general ledger, payroll, inventory control and order entry.

A Model 100 system with a 65K-byte processor, 165 char./sec printer, CRT terminal and a 10M-byte disk unit costs $43,400; a similarly configured Model 200 with an additional 10M-byte disk system, $51,400; a similarly configured Model 400 with two 20M-byte disk units, $61,400; a similarly configured Model 800 with two 40M-byte disk systems, $64,900; and a similarly configured Model 1600 with two 80M-byte disk units, $68,900.

For a maximum configuration, however, the cost of the top-of-the-line Model 1600 can total as much as $240,000, the official said.

All prices include the Micos operating system. Deliveries of the four stand-alone systems begin immediately from NLT Computer Services at 1777 Walton Road, Blue Bell, Pa. 19422.

PDP-11s and Nova 3s Get Memory Expansion Cards

SUNNYVALE, Calif. — Users of the Digital Equipment Corp. PDP-11 series can reportedly expand their main memory by up to 64K words, and users of the Data General Corp. Nova-3 series can reportedly expand their main memory by up to 128K words with a family of add-on cards from Intersil, Inc.

The IMC-3 provides capacities ranging from 8K x 17 to 128K x 17 for the Nova-3/4, -3/12 and -3D minis, while the IMC-11 offers capacities ranging from 8K x 18 to 64K x 18 for the PDP-11/04 and -11/34 minis, according to Intersil officials.

Using 16K-bit random access memory chips, the two single-card memory models provide both hardware and software compatibility with their host computers and can either operate with or replace core or semiconductor memories, the spokesmen explained.

The 15-in. by 15-in. IMC-3 cards plug into the Nova-3 slots and are compatible with DG's memory management and memory management protection options. They are also said to access in 300 nsec, operate from plus or minus 5Vdc and 15 Vdc, and interface with parity control and battery backup features.

The IMC-11 memory cards access in 405 nsec, provide battery backup and operate in any hex wide card slot, with standard or modified Unibus, the officials said.

Options with the IMC-11 include on-board parity generation, checking and control status address register circuitry.

Prices for the IMC-3 range from $1,450 for the 8K x 17 version to $5,395 for the 128K x 17 version. Prices for the IMC-11 range from $1,150 for the 8K x 18 type to $3,390 for the 64K x 18 board.

Both the IMC-3 and the IMC-11 are available from Intersil at 10710 N. Tantau Ave., Cupertino, Calif. 95014.

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Floppy Disk Interface for LSI-11 Handles Seven Disks, Diskettes

OAKLAND, Calif. — Up to four full-sized disk systems and three mini floppy units can reportedly be controlled simultaneously with a flexible disk interface for the Digital Equipment Corp. LSI-11 and LSI-11/2.

Computer Technology, Inc.'s FDI-L11 accommodates any single- or double-sided disk system with the Shugart Associates SA 800/ 850- and SA 400/450-compatible interfaces, according to Computer Technology spokesmen.

Media-compatible with DEC's RX11/RX01 floppy disk systems, the product provides device handlers for the DEC RT-11 operating system and incorporates a built-in programmable read-only memory bootstrap.

The interface also supports soft-sectored IBM formats with 128 byte/sector or user-selected formats with 16 to 4,096 byte/sector, officials said.

Capable of addressing up to 128K words, the FDI-L11 reportedly uses direct memory access (DMA) and provides a choice of four interrupt levels.

Increased Diskette Capacity

In addition to the DEC format of 128 byte/sector, the interface's standard device handlers support 512 byte/-sector formats, which increase diskette capacity by 20%, company spokesmen said. Moreover, customized device handlers simultaneously accommodate different types of drives and different formats like 128-, 256- and 512 byte/-sector types.

Equipped with a diskette initialization capability, the FDI-L11 consists of two boards — a floppy disk system controller and a DMA interface. Users can reportedly mount the boards separately or in piggyback fashion.

The FDI-L11 costs $945 with quantity discounts available from Computer Technology at 6043 Lawton Ave., Oakland, Calif. 94618.

Micropolis Boosts Disk Storage Capacity

CANOGA PARK, Calif. — Expanded storage capacity is available with both the single- and double-sided versions of Micropolis Corp.'s latest addition to its line of 5.25-in. OEM floppy disk systems.

The Series 1016's single- and double-sided models hold 473,000 and 946,000 bytes of formatted storage, respectively, compared with 315,000 and 630,000 bytes for comparable versions of Micropolis' 1015 series.

In quantities of 500, the single-and double-sided Model 1016 systems cost $305 and $429, respectively, from Micropolis at 7959 Deering Ave., Canoga Park, Calif. 91304.

DG Brings Out Print Subsystems For Nova, Eclipse

WESTBORO, Mass. — Two Nova- and Eclipse-compatible line printer subsystems from Data General Corp. are said to suit medium- to heavy-duty cycle printing requirements with 660- and 900 line/min outputs.

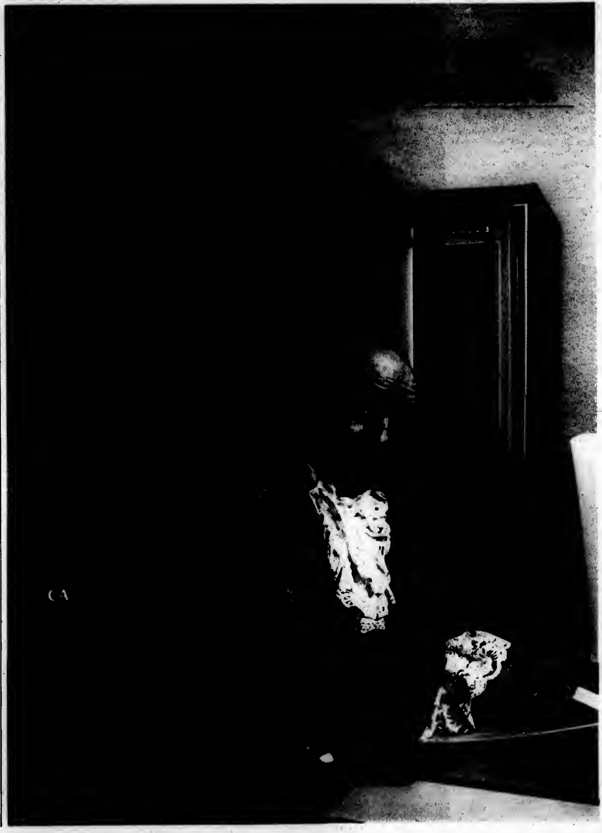
The Model 4244, the 900 line/min unit, provides an a 64-character Ascii set; the 660 line/min Model 4245, provides an upper/lower case 96-character Ascii set, according to DG officials.

Both models reportedly print 136-column lines on standard forms consisting of up to six parts.

Features standard with both subsystems include a former-alignment guide, paper puller, adjustable shelf, static eliminator for paper handling and folding in low-humidity environments and a ribbon deskew mechanism.

Each subsystem also provides horizontal formatting, a 12-channel direct-access vertical formatter and a DG controller that operates through a data channel under direct memory access.

With controller and paper receptacle, the Models 4244 and 4245 cost $25,500 and $27,000, respectively, from DG at Rt. 9, Westboro, Mass. 01581.



Board Quadruples Nova Memory

SANTA CLARA, Calif. — Four times more capacity than a standard Data General Corp. Nova memory card is reportedly available with a 256K-byte add-on memory from National Semiconductor Corp.

On one board, the Model NS D/3 supplies the maximum addressable memory for DG Nova 3 and 3/D CPUs and thus frees otherwise occupied chassis slots for additional I/O cards or other options, according to National Semiconductor officials.

The single-board memory also provides error-checking and correction circuits (ECC), which eliminate single-bit errors, plus an error logger and a diagnostic panel.

Although typically available in 128K by 22-bit configurations, the product also comes in 128K by 17-bit even or odd parity or 128K by 16-bit nonparity versions.

Depopulated configurations of the board provide 192K bytes and 128K bytes, with and without ECC or parity options.

The Model NS D/3 reportedly accesses in 450 nsec, cycles in 600 nsec and refreshes In 16 microsec. Packaged on a 15- by 15-in. board compatible with Nova hardware, software and peripherals, the memory operates with .9A at +15V, 4.1A at +5V, .9A at +5V and .03A at -5V.

Depending on word length, options and capacity, the memories cost $3,515 to $11,025 and are available from National Semiconductor at 2900 Semiconductor Drive, Santa Clara, Calif. 95051.

Disk Controller Debuts

SANTA ANA, Calif. — Compatibility with the Digital Equipment Corp. LSI-11 family reportedly highlights a single-board cartridge disk controller from Pentron, Inc.

The PF-LSI-RK plugs into any LSI-11 Q-bus without external chassis or Unibus converter and supports up to 20M bytes without modification of the DEC distributed operating systems, according to Pentron officials.

The PF-LSI-RK accommodates one to four 2.5M- or 5M-byte disk units, one or two 10M-byte disk units or one 20M-byte unit, Pentron officials said. Any of these disk systems can be single- or multiplatter models.

With cable, personality card and one-year warranty, the PF-LSI-RK costs $2,000 from Pentron at 1616 S. Lyon, Santa Ana, Calif. 92705.

Micro V Offers Single-Board CPU Supporting CP/M

IRVINE, Calif. — A single-board computer from Micro V Corp. supports Digital Research Corp.'s CP/M disk operating system including Basic, Fortran IV and Cobol, according to a spokesman for the processor's developer.

On a 9.5- by 13.5-in. board, the Microstar/5 integrates an Intel Corp. 8085 microprocessor, an Intel 8271 floppy disk system controller, 16K to 64K bytes of random-access memory (RAM) and two RS-232 interfaces.

The computer also incorporates a real-time clock, direct memory access channel and a programmable interrupt controller.

IBM-compatible floppy disk units that connect to the system reportedly include the Shugart Associates SA 800 and SA 850, California Computer Products, Inc. 142M and 143M and the Persci, Inc. 277.

Microstar/5 also interfaces with the Shugart SA 400 and SA 450 mini floppy units and with printers from Teletype Corp., Centronics Data Computer Corp. and Diablo Systems, Inc.

In OEM quantities, a 32K-byte Microstar/5 costs $1,270. A CP/M application software development system with a 32K-byte RAM, 512K-byte dual-floppy disk system and RS-232 interfaces for a CRT terminal and line printer costs $3,995.

Micro V is at 17777 S.E. Main St., Irvine, Calif. 92714.

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Menswear Retailer Hems Monthly Budget $150

By Marguerite Zientara
CW Staff

HOBBS, N.M. — A monthly expense cut of $100 to $150 and a computerized accounting program are what Bailey's got when it purchased its own minicomputer system 16 months ago.

For several years, the menswear retailer here had used a bank service bureau to process its accounts receivable. "The bank system was a super setup, but with the price increases every year we felt it was time for us to branch out and get our own system," according to John Billingsley, co-owner of the concern.

In shopping for a system, Billingsley said, the primary concerns were the volume of data the equipment could accommodate and hardware costs. Billingsley considered systems from Randal Data Systems, Inc., Texas Instruments, Inc. and Sharp Electronics Corp.

"Randal and TI were too expensive and couldn't give us the same information that Sharp could," he noted. "We considered others that could fulfill our needs, but they were way out of line as far as expense was concerned."

Software the Clincher

So Bailey's purchased Sharp's PC-2710 minicomputer system and installed it in March 1977. "Perhaps the major thing that sold us on this was the software that went with the package — the combination of hardware and software was really the selling factor," Billingsley recalled.

Applications performed by the system include accounts payable, accounts receivable, payroll, customer credit status and mailing lists. "The program for the general ledger alone makes the computer worth the investment," Peggy Billingsley, Bailey's bookkeeper said.

The accounts receivable programs provide daily transactions, monthly financial charges, customers' monthly statements, a sales check list and month-to-date activity.

In addition to the money saved, Peggy Billingsley estimated she saves a minimum of six to eight hours at the end of each month when compiling monthly statements and printing and mailing invoices. Moreover, she saves "several hours" each week in compiling month-to-date statements, she added.

With the accounts payable programs is a purchase journal feature that itemizes all totals for the general ledger and lists items by wholesale and retail prices — information the Billingsleys enter into the system twice a month. It also lists suppliers, invoices owed and due dates and cross references dates when invoices are due.

In addition, the unit tabulates and balances journal entries as they are added daily into the general ledger and prints financial statements. A separate customer credit list and a gift certificate list are also programmed into the unit, according to Billingsley.

The daily printout of customer credit standings is posted at the front sales counter of the store so salespeople can make instant credit checks on customers.

Less Expensive Advertising

The system has also affected the store's advertising program, according to Billingsley. In the past, Bailey's used the bank service bureau for direct advertising mailings to its more than 2,000 credit and "preferred" customers.

The bank's mailing service cost $300, with six mailings per year totaling $1,800. With the current system, each mailing costs $20, Billingsley said. The system stores the mailing list and, when programmed, prints address labels.

Through an informal survey, Bailey's discovered its direct mail advertising is its most effective form of publicity. As a result, the store has since reduced its television advertis-

(Continued on Page 95)

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Manages Nine Benefit Funds

Union's Mini Handles 18 Weeks' Work in Day

ROCHESTER, N.Y. — In less than one day, a minicomputer system at a local union's fund management office can perform all the clerical and financial accounting functions that used to take the office more than 18 weeks to complete.

Under the direction of fund manager John Cullen, the system simultaneously manages nine funds — each with different assets, structures and financial management teams — for the 1,200 nationwide members of the Plumbers' and Steamfitters' Union Local 13.

Senior operations clerk Corrine Whalen inputs data from Local 13's employee benefit report.

Housed in the union's Fringe Benefit Fund Office, the system maintains continuing records of each member's accumulated benefits from each fund and periodically reports these benefits in a series of financial statements distributed among the union's membership.

With this information, the fund office has improved communications to and from the union's rank and file and in some instances has been able to provide immediate responses to employee inquiries that sometimes used to take two to three hours to answer.

Before they acquired their current system, Cullen and his staff managed the union's benefit funds sporadically and inefficiently by manual methods. "It was a nightmare," the fund manager said of the former system

Each team of fund supervisors — none of whom were versed in administration, economics or financial law — managed its own account separately with little or no regard for standardization of procedures.

When the time came to figure each union member's benefits from each of the nine funds, office workers performed the necessary computations by hand and then manually posted the results on cards circulated to the 1,200 employees. For each fund, benefits took an average of two weeks to calculate, and altogether the subsequent posting required another month.

"The bookkeeping was horrendous," Cullen recalled. "We kept three or four sets of books for a monthly operation."

To answer inquiries about financial matters like the amount of a given union member's benefits or the date they were deposited in the bank often proved a major undertaking. Moreover, the union had to assign a different individual to monitor inputs to each fund — a procedure that proved "a terrible waste of effort," Cullen said.

The final crisis occurred in 1974 with the passage of the Employees Retirement Insurance Security Act (Erisa), which requires employers to provide union workers with an annual report detailing the employee's accumulated pension credits and specifying the credits' status as vested or nonvested.

At the time, the complexity of managing nine simultaneous funds prevented Cullen and his staff from providing the union's rank and file members with periodic records about their financial fringe benefits. Realizing they could not meet the Erisa requirements under their old manual system, the funds-management staffers decided to automate their tedious accounting procedures with an in-house small business system.

After evaluating various alternatives for three to four months, the funds managers for Local 13 opted for a 24K-byte Wang Laboratories, Inc. WCS-30 system with a printer and 10M-byte disk unit. Main selection criteria for the union's system included CRT screen size, cost, processing power and reliability, Cullen explained.

Data Base Entry

Under the current system, as with the previous accounting method, Local 13's fund office receives a monthly Employer Benefit Report and a benefit check from each of the union membership's employers. For each employee listed in the reports, a computer operator enters an eight-digit identification number, a work classification code (the fund office recognizes about 100) and the number of hours worked — a statistic summarized in the monthly records.

Based on this sequence of data entries, the system performs a complex series of mathematical calculations for each fund and then transmits the results to an employer master file, member master file and file for each of the nine funds.

From the resulting data base, the system generates reports including weekly reports describing employer contributions to each fund and monthly reports describing employer contributions to each fund.

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Disk Unit Emulates 16 Series/1 Controllers

SUNNYVALE, Calif. — Almost all the software for the IBM Series/1's Model 4962 disk controller also reportedly runs on a disk controller from Microcomputer Systems Corp. (MSC).

The Series/1-compatible MSC-1200 accommodates 40M to 300M bytes of removable or fixed storage and, except for diagnostic programs, is transparent to the Series/1's operating system, according to MSC officials.

The controller plugs into a Series/1 I/O slot through a single-board, microprocessor-based host adapter. It provides an optional address translation algorithm that permits emulation of up to 16 of the 9.3M-byte 4962 systems.

Capable of controlling up to four high-density disk systems, the MSC-1200 is said to provide automatic track seek and verify, data error correction, command chaining support, differential data transmission and defective track flagging.

The unit executes self-test firmware each time it is turned on, and users can initiate microdiagnostics by manual techniques or Series/1 programs.

At $9,500, the controller will become available during the last quarter from MSC at 440 Oakmead Parkway, Sunnyvale, Calif. 94086.

Modules Allow DEC Users To Tailor Interface Logic

MAYNARD, Mass. — Customized interfacing logic can reportedly be configured for the LSI-11 and PDP-11 computer families with the latest addition to the Digital Equipment Corp. line of wire-wrap modules.

The W9500 series comes in double, quad and hex heights with or without premounted dual-in-line package sockets, according to DEC spokesmen. Each module accepts integrated circuit packages and can be wrapped by hand or with standard automatic wrapping techniques.

Modules without premounted sockets accept circuit packages with .3-, .4- and .6-in. pin centers. Modules with sockets accept 16-pin circuits with .3-in. centers, the officials said.

Space between the sockets permits installation of discrete components like decoupling capacitators, they added.

Space for Circuits

As with their socketless counterparts, the modules with sockets provide space for circuit packages with .3-, .4- and .6-in. centers.

All sockets provide a 40-pin male connector for an interface cable, and the quad and hex height W9500 versions offer space for a second cable connector, the spokesmen noted.

A printed circuit on each module is said to connect appropriate edge connector pins on the back side and component side with edge connector pins reserved for user functions. Etched into each board is an alphanumeric X-Y grid pattern to ease pin location and identification, the DEC officials explained.

Depending on height and availability of sockets, the wire-wrap W9500 modules cost $60 to $325 and are available off-the-shelf from DEC at 146 Main St., Maynard, Mass. 01754.

Mini Hems $150 Off Store Budget

(Continued from Page 93)

ing "considerably," cut its total advertising expenditure "significantly" and increased the number of direct mailings to about one per month, John Billingsley said.

"We are spending the same amount of advertising money overall, but are getting more exposure for it," he added.

The PC-2710 minicomputer holds 4K bytes of programming memory and 1.6K bytes of numeric computation memory, according to Eugene Stepter, the local Sharp agent.

Wed to a Typewriter

For a while after it was installed, the system was "married" to an IBM "Selectric typewriter, Stepter recalled. But between June and August of 1977, Bailey's converted to a 45 char./sec Centronics Data Computer Corp. 761 KSR printer.

Bailey's couldn't input information through the 12.5 char./sec Selectric, and the Centronics machine is "faster, more reliable, quieter, gives off less heat and recycles its own print ribbon," Stepter said.

"You'd be surprised," he noted. "The majority of problems everybody has is running out of ribbon in the middle of a report."

The system also incorporates two California Computer Products, Inc. floppy disk systems, each with 250K bytes of on-line storage.

Billingsley plans in "about four years" to upgrade his system to Randal equipment to keep up with store expansion.

"By that time we expect to be handling more than double the volume we're handling now," he pointed out. "It will probably cost twice the price of our current system, but by then we'll need the extra speed and volume."

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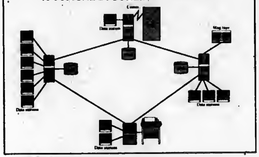

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BROOMFIELD, Colo. — Delicate floppy diskettes no longer need to suffer the indignities of coffee spills, cigarette burns or other unintentional human assaults, thanks to a flexible-disk storage cabinet from A-Team, Inc.

The Floppy Disk Storage System comes in three versions with vertical filing slots for 15, 30 or 50 diskettes, according to A-Team officials.

When not in use, diskettes are stacked inside the portable plastic cabinets, where they and their data are said to be protected from creases, folds and most of the other routine hazards of human handling.

Users can later retrieve diskettes for use by pressing the appropriate control buttons.

Measuring 4.25 in. wide by 9.75 in. high by 10.5 in. deep, a 15-slot version weighs 4 lbs and costs $69.95, compared with $119.95 for a 30-slot version, which weighs 8 lbs and provides the same dimensions except for an 8-in. width.

A 50-slot version with a 13-in. width weighs 13 lbs and costs $179.95. All three beige cabinets are available from A-Team at Box 719, Broomfield, Colo. 80020.

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COMPUTER SYSTEMS AND EQUIPMENT

Small System Gives Plains Town That 'Top-of-the-World' Feeling

(Continued from Page 89)

had repeated the process for each water and sewer service bill, they used the posting machine to add the three figures. They then referred to another chart to compare sales tax for the resulting subtotals.

Unfortunately for city employees, the largely unautomated utility billing procedure proved time-consuming, as did the town's equally tedious payroll and accounts payable systems, Hanna recalled.

Choices Limited by Locale

So in 1976, members of the town council launched a search for a computerized alternative to their manual accounting procedures. They limited their search to NCR, IBM and Burroughs Corp. hardware because, as Hanna explained, "We're kind of out in the boonies here," and those three vendors "were the only ones with offices near enough to provide the level of service we wanted."

The councilmen then began evaluating each company's small system offerings in an attempt to select the best equipment for the town's needs.

As part of the hardware evaluation, local government administrators visited several neighboring communitites and evaluated installations representing each of the three prospective vendors.

One of the council members drove to a small community 30 miles east of here to observe a Burroughs system similar to one that was being considered for Hanna and his staff. But when the visiting official arrived at the Burroughs site, he learned that the equipment had fallen far short of its users' expectations.

"In fact, it was taking them longer to do their work with their new computer than it was with their old posting machine," Hanna recalled.

Taking a cue from the neighboring community's experiences, council members here soon eliminated Burroughs from consideraton as one of the town's prespective vendors. "The town council wasn't technically oriented. So I don't think there was a formal evaluation," Hanna speculated. "They just said to themselves, 'Well, if that's what Burroughs does, we don't want it.' "

At about the same time, another local representative traveled to Hays to investigate an IBM System 32 installation, only to discover that the cost of that offering would exceed the town's self-imposed hardware budget of less than $20,000.

Counter Offer Accepted

Shortly after the council rejected the System 32 as a candidate for installation, however, IBM proposed a Model 5100 system. The town council considered and then accepted the counter offer in January 1977, and a month later it installed a 32K-byte 5100 with two integrated tape drive units and an integrated 80 char./sec bidirectional printer.

On May 1, 1977, the system gained its first application software module — a utility billing package that serves more than 1,000 area customers and allowed the city clerk's office to sell its still serviceable posting machine to a nearby community for $250.

Last March, the town implemented its second software package — an accounts payable module — and only six weeks ago, a payroll package for 50 full- and part-time city employees was added to the system, Hanna reported.

With the three Basic software modules, personnel in the city clerk's office no longer have to refer to their prepared cost/consumption charts to figure a customer's combined electrical, water and sewer service bill. Instead, the system automatically calculates the total based on the customer's current utility meter readings, Hanna explained.

This November, the town plans to further enhance the system with two additional software modules for fund/-accounts posting and budget comparisons.

To date, the system has never experienced a shutdown of more than four hours, Hanna said. In fact, the equipment's most serious problem thus far stemmed from a malfunctioning paper-feed alert, which the city clerk himself fixed.

GA Users Plan Sept. Powwow

CHERRY HILL, N.J. — Users of General Automation, Inc. minicomputer and microcomputer hardware will reportedly be able to choose from among 25 technical sessions and workshops at the 15th semiannual General Automation Users Group Exchange (Gauge) Fall Conference, slated for Sept. 12-15 at the Hyatt Hotel here.

Sponsored by Gauge, the meeting will cover distributed processing, communications and transaction processing.

For Gauge members, prepaid registration totals $30; for non-members, $40. Registration at the meeting costs $35 for members and $45 for nonmembers.

A conference agenda and registration information are available from Gauge at Box 8130, Anaheim, Calif. 92802.

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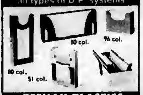

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For Users, Retail Dealers

PCC Announces Financing for Mits Line

By CW Staff Writer

OJAI, Calif. — Pertec Computer Corp. (PCC) has announced a financing program that will enable potential users of the Mits line of small business computers to finance their systems through Commercial Credit Services Corp., a subsidiary of Control Data Corp.

The program will also enable retail dealers to finance as much as 100% of their inventory for 30 days or smaller amounts for up to one year, PCC said.

Although Commercial Credit's lending rates are as much as 2% higher than those of some other lending institutions in some areas, its requirements are "not as strict," according to Dan Shehan of the Mits Computer Center, a store in Burlington, Mass.

For example, to get the best loan rates, a potential user has to have a strong credit background and must show proof of a successful business operation for as long as three years.

The interest rate offered by Commercial Credit is the prime rate plus a fixed increment, according to Don M. Muller, PCC executive vice-president and chief operating officer. The lease or purchase agreements will be 24- to 60-month contracts,.

The Mits line of equipment ranges in price from $6,000 to about $20,000 for a unit that includes a processor and various peripherals plus some applications packages such as general ledger, accounts receivable, accounts payable, payroll and inventory.

Under the arrangement with Commercial Credit, each Mits dealer will contract separately with the Commercial Credit office closest to his store, according to Muller. Normally, the individual who wishes to purchase such a small business system would have to work out his own financing arrangements through a bank or some other credit outfit.

While the Commercial Credit arrangements do not provide the cheapest rates, it "eliminates the need to shop around for credit," Shehan pointed out, "and if your time is worth anything to you, it's probably worth it."

In addition, the loan application is very forthright and easily understood compared with some of the other forms he has seen, Shehan said.

Commercial Credit's network of regional and local finance centers are near the 51 Mits outlets now open and those anticipated in both the U.S. and Canada, PCC said.

Micro Chips

Structured Basic Offered to 6800 Users

BOSTON — A three-pass compiler written in 6800 Assembly language that provides a disk-based, high-level language for microcomputers with at least 16K of random-access memory (RAM) is being offered by Hemenway Associates, Inc.

The language, called Structured Basic Language (Strubal), features fully relocatable and linkable code, according to the firm.

Versions of the compiler are available for Icom, FDOS-II, Smoke Signal Broadcasting DOS68 and Southwest Technical Products Corp. SWTPC Flex operating systems.

The software supports various scientific functions, one- and two-dimensional arrays, three data types, structured programming forms, string functions, embedded Assembly language in the source program and common and dummy sections, the firm said.

Line numbers are not required in source programs. Subroutines may be separately compiled or assembled and called by named parameters, according to the firm.

The compiler, including runtime package, is provided on floppy disk. The user manual reportedly presents example programs illustrating the important constructions of Strubal. Together they cost $99.95 from Hemenway Associates, Suite 8P, 151 Tremont St., Boston, Mass. 02111.

4K CMOS RAM Card Features Battery Backup

MONTEREY, Calif. — Pro-Log Corp. has unveiled a 4K CMOS random-access memory (RAM) card with a battery backup that permits data retention for five to 20 days.

The Model 8122 is expandable in 1K-byte increments, with each having a write-inhibit switch that prevents inadvertent memory overwrites, according to the firm.

The 8122 memory card implements 6508-type CMOS RAMS and is compatible with Pro-Log's 6800-based systems. The 8122 is available in four versions, depending on the amount of memory specified, and costs between $150 and $450 in single quantities from Pro-Log Corp., 2411 Garden Road, Monterey, Calif. 93940.

Three-Unit NMOS Family Fits Intelligent Control Applications

WELLESLEY, Mass. — A three-member family of single-component, 8-bit NMOS microcomputers has been introduced by NEC Microcomputers, Inc. for use in intelligent control applications in small to medium-sized systems.

The main advantage of the 8048 family is that each 40-pin micro contains read-only memory (ROM), random-access memory (RAM) and an I/O processor and is the equivalent of a large number of individual devices normally required in an MPU-based system, according to the firm.

The three processors require a +5V power supply, have more than 90 instructions, 70% of which are single-byte; are available in cycle times ranging from 2.5 microsec to 5 microsec; and are fully compatible with the NEC UCom-8 series of peripheral chips and the industry-standard 8048 devices, the firm said.

The UPD8048 is a 40-pin device that includes an 8-bit parallel processor; 1K by 8 bits of masked ROM that is custom-programmed to user specifications and 64 by 8 bits of RAM for user data. The UPD8048 can be expanded with off-chip ROM up to 4K for program data and/or RAM up to 2K for user data and costs $6.95 each in quantities of 10,000 units.

The UPD8035 is functionally and pin-compatible with the UPD8048 but has no on-board masked ROM. The UPD8035 is an NMOS silicon-gate device designed for use with off-chip ROM or programmable read-only memory (Prom) up to a maximum of 4K bits. It costs $11.10 each in 100-unit quantities.

The third member of the family, the UPD8041, is a universal programmable peripheral 8-bit microcomputer that can be used as an interface between another processor and any type of peripheral device, the firm said. It can also act as a controller in 8080A, 8085A and 8048 family systems.

The UPD8041 includes a 1K by 8-bit masked ROM programmed to the user's specifications, a 64 by 8-bit RAM for data storage and 18 programmable I/O lines for input or output.

The UPD8041 costs $6.95 each in quantities of 10,000 units, NEC Microcomputers said from 173 Worcester St., Wellesley, Mass. 02181.

Two Vector Prototyping Boards Aid Design of Series 80 Types

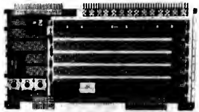
SYLMAR, Calif. — Vector Electronic Co., Inc. is offering two prototyping boards which are form- and size-compatible with the Intel Corp. SBC 80/10 and SBC 80/20 and National Semiconductor Corp. BLC-80/10, BLC-80/11, BLC-80/12 and BLC-80/14 boards.

The models 4608 and 4608-1 have five double-sided card-edge connectors for bus-oriented, parallel or serial I/O, Vector said. Both measure 12- by 6.75- by .042-in. and are prepunched with holes .042 in. diameter on .1-in. grids.

The boards accommodate dual in-line packages (DIP) with .3-, .4-, .6- and .9-in. lead spacing as well as other components such as solid-state relays, electromechanical relays and thumbwheel switches, a spokesman noted.

The Model 4608 holds up to 54 16-pin DIPS in the patterned area and also has a 13 sq-in. unclad area for "total freedom in component placement," he added.

Card-edge connector contacts are unassigned except for the four end contacts on the 86-terminal connectors, which are connected to a ground bus.



Vector board is form- and size-compatible with Intel SBC 80 and National Semiconductor BLC 80 series microcomputer boards.

The Model 4608-1 is identical to the Model 4608 in size and edge connectors, but has no etched pattern. The 4608-1 holds up to 144 16-pin dips. The five card-edge connectors are compatible with Intel's Multibus or National Semi's Microbus, the firm said.

The Model 4608 costs $45 each for one to four boards and the 4608-1 costs $34 for one to four boards; they are available off-the-shelf. Vector is at 12460 Gladstone Ave., Sylmar, Calif. 91324.

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'Personal Ledger' Permits Double-Entry Bookkeeping

GOLETA, Calif. — Channel Data Systems has introduced Personal Ledger, a double-entry bookkeeping system with provisions for budgeting and keeping records of income, deductible and non-deductible expenses, assets and liabilities, according to the firm.

The software allows a novice user to enter transactions, add or edit accounts and print a detailed income statement and balance sheet.

Up to 50 accounts are accommodated, with names and budgets specified by the user. An audit trail of all entered transactions is generated on the user's printer.

All data is stored on cassette, loaded prior to entering transactions and stored after entering transactions. Error recovery features allow reentry of an erroneous instruction or value.

Personal Ledger is supplied on cassette with a manual, program listing and sample data for $20 from Channel Data systems, 5960 Mandarin Ave., Goleta, Calif. 93017.

Five Programs Available For 32K-Byte Machines

STANFORD, Calif. — Compumax Associates is offering five application packages, each with its own data entry program that can list, verify and update data for the small business computer user.

The packages are Microledger, a general ledger system that handles up to 785 accounts; Micropay, a series of programs that perform the accounts payable functions; Microrec, an accounts receivable package; Micropers, a payroll and personnel file system; and Microinv, an inventory control system.

All of the programs, which guide the user through each step, can be used alone or through the Microledger system, which directs transactions through the accounting routines and financial reports, the company said.

The programs are written in Basic and can be used on any micro with a 32K-byte memory, the firm said.

The Microledger, Micropay and Microrec packages cost $120 each and the Micropers and Micorinv packages cost $180 each from Compumax Associates, P.O. Box 4544, Stanford, Calif. 94305.

Users of 8086s Gain Support On Development

LOS ANGELES — Futuredata Corp. has added the 8086 16-bit microprocessor to the array of 8-bit processors supported by its micro development system.

The 8086 systems are software-compatible with both the 8085 and the 8080, but deliver up to 10 times the processing power at 5MHz, Futuredata said.

A full range of disk-based 8086 systems are offered, the company said. Each includes a microprocessor unit with up to 256K bytes of memory, high-speed 960-character CRT, Ascii keyboard, dual floppy disk operating system software and documentation.

The Microsystem/32 Model 86 with 32K bytes of memory and dual 8-in. double-sided, double-density floppy disk unit costs $9,625 from Futuredata Computer Corp., 11205 S La Cienega Blvd., Los Angeles, Calif. 90045.

Report Describes Business Micros

CHERRY HILL, N.J. — Management Information Corp. (MIC) has produced a publication describing what a potential business user needs to know before purchasing a system.

The 24-page publication, entitled "Personal Computers for the Businessman," explains what a microcomputer is and how it differs from a minicomputer. It also describes what shopping strategy to follow.

The report costs $7.50 from MIC, 140 Barclay Center, Cherry Hill, N.J. 08034.

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Computerworld's September 25th Special Report, *Stretching the DP Dollar*, will tell you how to do just that — with articles, tips, and pointers on dozens of ways to save DP expense within your organization. Edited by Ann Dooley, *Stretching the DP Dollar* gives you first-hand accounts of how various users have trimmed *their* DP operating costs. We'll have advice from vendors as well, and you'll learn about things like:

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Davies Outlines Functions

Racal Forms Communications Group

By Marcia Blumenthal
CW Staff

NEW YORK — The recently formed Data Communications Group of Racal Electronics Ltd. is *not* a division of the parent company, D. Leighton Davies, the group's chief executive, emphasized recently during one of his frequent whirlwind visits to the U.S.

Rather, he continued, it is a structured group formed to coordinate Racal's product strategy and optimize data communications products both technically and from a market perspective. Another task of the group is to avoid unnecessary overlaps in products among the companies comprising the group.

However, Davies said he does not intend to centralize the manufacturing or sales functions of the individual companies. They are highly competent the way they are, he said.

At present, the principal members of the group are Racal-Milgo Ltd., formed in 1969; Racal-Milgo, Inc., located in Miami, which was acquired by Racal after a long battle with Applied Digital Data Systems, Inc. [CW, Feb. 28, 1977]; and Racal-Vadic, Inc. of Sunnyvale, Calif., which was acquired last April.

"A main tactic of Racal is to put a group of companies under the wing of one of the members of the board of directors," Davies explained. "That way the parent company knows which person is accountable for the growth of the group."

Global Responsibilities

As chief executive of the group, Davies has global responsibilities for the engineering, manufacturing and marketing of all Racal data communications products.

D. Leighton Davies

Davies, a burly man with twinkling blue eyes, takes all this in stride, modestly describing himself as a "dyed-in-the-wool" engineer who became a manager because of the attrition of other employees.

Describing the varied activities of the group, Davies said, "for instance, a particular modem may be a gem for the U.S., but it just happens to miss the point everywhere else." What the group does is identify this risk and plan for it.

One of Racal's greatest strengths is its expertise in international marketing. The firm has great skill in exporting and defining the peculiar marketing requirements of individual countries, Davies continued, adding that that strength, in fact, was one of the reasons Vadic approached Racal with a proposal for acquisition. (See related story on Page 101.)

To assure that the group does exactly what it has set out to do, Davies has appointed a technical director and a product strategist from the parent company to work full-time with the group. "The technical guy will talk over with the market strategist whether a modem should have a microprocessor. The strategist will determine whether that type of product is feasible for the marketplace."

Davies parried rumors that all was not smooth sailing among group members, particularly Racal-Milgo. Recent comments that the price paid for Milgo was too high had led observers to believe that some streamlining of Milgo personnel would be made after the group was formed.

Although Davies said Racal should have acquired Milgo two years earlier than it did, he said Wall Street's evaluation of the price was conducted externally, without an understanding of the situation. The merger and the price paid for Milgo did not create bad feelings, Davies declared, adding that no streamlining at Milgo is anticipated. Matt Kenney, vice-president of sales and marketing at Milgo, con-

(Continued on Page 100)

Capital Gains Tax Relief Urged

WASHINGTON, D.C. — Executives of seven companies in the DP industry recently met with Speaker of the House Thomas P. O'Neill to express their support for a bill that would restore the maximum capital gains tax rates to pre-1969 levels of 25%.

The Steiger/Hansen bills are slated for discussion in Congress within the next two weeks, a Data General Corp. spokesman said.

The seven, representing the New England Chapter of the American Electronics Association (AEA) as well as their respective companies, told O'Neill that high-technology companies in Massachusetts provide more than 200,000 jobs, one third of all manufacturing jobs in the state. Growing at about 20% per year, these jobs are one of the state's few sources of private-sector job growth, the group claimed.

Pointing out that 30% of the products of these companies are exported — a positive contribution to the U.S. balance of trade — the AEA representatives said this pace of growth cannot continue without relief from capital gains taxes.

More than 200 high-technology companies were formed in Massachusetts between 1964 and 1969; but since then less than 50 companies have been formed, the group declared.

Aside from the Steiger/-Hansen bills, a compromise bill sponsored by Rep. James R. Jones (D-Okla.) which rolls back the maximum capital gains tax to 35% has been reported out of the House Ways and Means Committee, the spokesman said.

Both bills are expected to be ironed out by a joint committee, with a compromise bill resulting.

The AEA representatives presenting the joint position to O'Neill were George M. Berman, chairman of the board of Unitrode Corp.; Edson D. deCastro, president of DG; Kenneth G. Fisher, president of Prime Computer, Inc., Arthur L. Goldstein, president of Ionics, Inc.; Andrew C. Knowles, vice-president of corporate marketing for Digital Equipment Corp.; Samuel Labate, chairman of Bolt, Beranek & Newman; and Ray Stata, president of Analog Devices, Inc.

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Davies Outlines Racal Communications Group

(Continued from Page 99)
firmed Davies' remarks.

Rated a strong company in the UK, in 1977 Racal rated first in profit based on capital employed and has had an annual gross sales growth rate of 42% and an annual growth in pretax profit of 54%.

Racal is targeting worldwide sales of $400 million for the current fiscal year, started April 1, with $100,000 expected to come from U.S. markets. Data communications products are expected to account for at least 27% of the company's revenues.

Last year, Racal grossed $341 million worldwide, with $70 million from U.S. sales.

Wider Product Basis

Davies said Racal will reach its growth targets through marketing its products on a wider basis and through acquisitions — possibly three or four companies a year, Davies estimated.

The acquisition of Vadic gave Racal a foothold in the low-speed modem sector of the market, he noted.

Davies dispelled the notion that Racal's business would be hurt because of the predicted obsolescence of modems. Not quite sure when that obsolescence might occur, Davies noted it would be in somewhat less than 10 years but more than five.

The firm will be changing its product mix gradually, he said. Seventy percent of Milgo's business is in modems, but it is now diversifying, moving into network management, nodal communications devices and front-end processors.

The company will still be involved with high-speed data communications networks, he indicated, but the products will be different.

International Aspects

Further, Davies reemphasized the international aspects of Racal's markets, noting the repercussions of technological developments in the U.S. are usually not felt so quickly in the global marketplace. This would definitely have a softening effect, he pointed out, allowing Racal's data communications companies to change their product mix gradually.

The effort to assure the Data Communications Group works is a commitment made at the top-management level, with frequent meetings with the parent company executives. "After all," the peripatetic Davies pointed out on his way out the door, "Racal spends $2 million a year on travel."

Dealers Offered Tech Workshop

SAN LEANDRO, Calif. — Computerland Corp. will host a Technicians' Workshop here for all its dealers late this month.

The two-week workshop will provide thorough hands-on experience and training with the latest equipment and will involve the participation of professional instructors and engineers from all major manufacturers in the industry, the company said.

Richard Van Leer, Computerland's technical services manager, claimed that the results of the workshop will put Computerland dealers 18 months ahead of the competition on a technical basis.

Typical Technician

The typical Computerland technician, a spokesman said, has spent several years in DP either in hardware or software, but wanted to move to a retail environment. Or, he may be someone majoring in computer sciences at a university.

Store owners are screened prior to being granted a franchise and typically have seven to 20 years' experience in DP, the spokesman added.

At the workshop, the company is expected to reveal plans for introduction of factory-authorized service.

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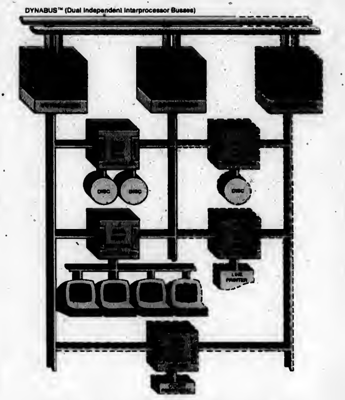

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Acquisition Brought Cash Infusion

Racal Merger Gave Vadic Way to Extend Scope

By Marcia Blumenthal
CW Staff

SUNNYVALE, Calif. — How does a company with a limited product line go about expanding the scope of its business? Being acquired is one solution — and it's an option being considered by many smaller companies today.

Vadic, Inc., now Racal-Vadic, Inc. wanted to expand its product line from low-speed modems to higher speed modems and multiplexers. To do that would have taken a large amount of capital, "and the risk was high because there are a lot of established companies in the marketplace," according to Tom McShane, vice-president of marketing and sales for Racal-Vadic.

Vadic solved its problem by approaching Racal Electronics Ltd. with a proposal for acquisition. Vadic gave its investment banker a strict list of requirements for screening prospects.

"It was like a father in the old days trying to find a suitable husband for his daughter," McShane said in describing the process.

Vadic considered it important to affiliate with a company that knew the product line, McShane said. The acquiring company also had to have an international market and exporting expertise, as Vadic had been exporting only 8% of its product and saw the global marketplace as a great opportunity.

A strong financial position was another criterion. Vadic has never leased or rented equipment, McShane said, but a lot of communications equipment is leased and it knew there is a lot of money to be made in this area. However, leasing requires a heavy capital outlay, he pointed out.

Paying cash or a cash equivalent was a requirement high on Vadic's list. "Our stockholders wanted out," McShane delcared. They had been with Vadic since 1969 and wanted a return on their investment; Vadic never paid dividends.

"It became pretty obvious that we would have to go public or merge," McShane recalled.

First Contact

After deciding on the merger route, "oddly enough, Racal was high on our list and our banker contacted it first."

The merger proceeded with great speed, D. Leighton Davies, chief executive of Racal's Data Communications Group, remembered, with Racal paying about $10.7 million for Vadic. The merger was finalized April 18.

Since the merger, McShane reported, the company has had an influx of cash and has been able to expand engineering and marketing activities in order to work on product development and enhancement.

"We've experienced cost reductions in-plant because of the installation of automated test and assembly techniques," McShane stated. "We are now much more inclined to commit ourselves to capital expenditures because we do not have to borrow money to acquire those goods."

So far Vadic has been impressed with what it's seen of Racal's management team, McShane concluded.

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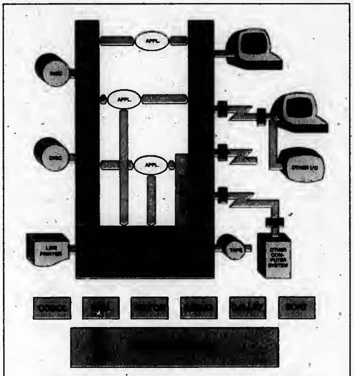

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For further information, contact Tandem Computers, Inc., 19333 Vallco Parkway, Cupertino, California 95014; Frankfurt, West Germany; Uxbridge, England; Toronto, Canada.
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According to Micronet Report

GSA Accounts for 8% of Micrographics Sales

By Marcia Blumenthal
CW Staff

ROCKVILLE, Md. — The federal government's General Services Administration (GSA) accounts for 5% to 8% of the total micrographic industry market, with 31.8% of that market comprising computer output microfilm (COM) equipment, according to a report recently published by Micronet, Inc. here.

Although the report is confined to data supplied by the GSA, Larry A. Stockett, Micronet's president, said the report marks the first time detailed micrographic industry market data has been published.

"It is also the first report based on hard data [GSA contract reports] rather than guesswork or estimates from industry sources," Stockett claimed.

The GSA is the agency responsible for the U.S. governments purchasing activities. The report did not specify particular agencies purchasing COM equipment.

Market Breakdown

The total GSA micrographic market totaled $80.7 million based on data from July 1976 through December 1977, with the equipment market accounting for $32.4 million or 40.2%, of the total market (Figure 1). COM equipment comprised 31.8% of the equipment market, or approximately $10.3 million of the GSA market (Figure 2).

Aside from equipment, supplies comprised 25.2% and services totaled 34.7% of the GSA micrographic market (Figure 1.)

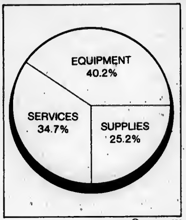
According to the report, 67% of the COM market consisted of rental equipment, 18% of purchased equipment and the remaining 15% of accessories for COM (Figure 3).

Leaders in the GSA COM sector were Datagraphix Corp., with nearly 60% of the market, and Information International, Inc., following with 24.9% (Figure 4).

Micronet noted that almost all major companies in the marketplace have GSA contracts, with most medium-sized and many small competitors sharing in the market. The GSA market represents 5% to 8% of the total micrographic industry market, Micronet estimated.

Data contained in the report was obtained from the official GSA contract reports which must be submitted monthly by all vendors awarded annual contracts for micrographic equipment.

The report, which contains more than 40 charts, graphs and tables and includes notes on the inadequacies of the reported data, costs $25. It is available from Micronet, 14501 Carrolton Road, Rockville, Md. 20853.



Charts ©Micronet 1978

Figure 1

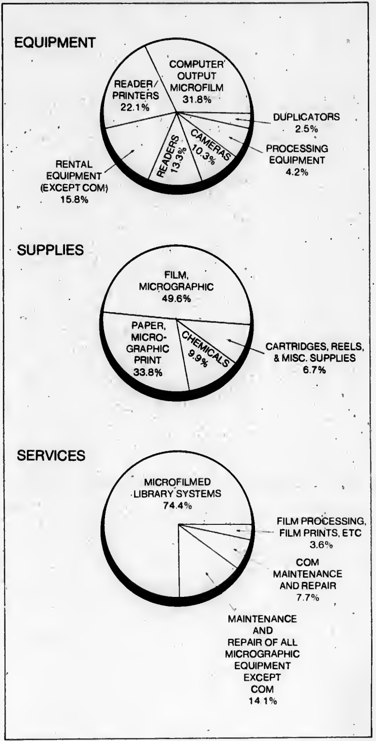


Figure 2

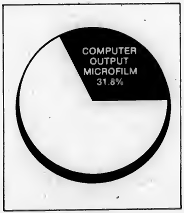


Figure 3

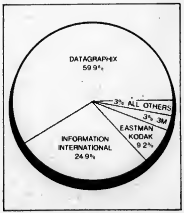


Figure 4

NCR Agrees to Buy Quantor For Price of $7.5 Million

DAYTON, Ohio — NCR Corp. has agreed in principle to acquire Quantor Corp. for approximately $7.5 million in cash. Under the terms of the proposal, NCR would pay $3 per share to shareholders of Quantor common stock.

The acquisition is subject to the approvals of the boards of directors of both companies and by Quantor's stockholders. If the negotiations proceed as planned, NCR said, the acquisition could be completed by the end of this year, with Quantor becoming part of NCR's Systemedia Division.

NCR was instrumental in Quantor's early marketing efforts. This past spring, the two companies finalized a three-year agreement under which NCR would service and maintain most Quantor equipment in the U.S.

However, Quantor recently negotiated an agreement in principle under which Agfa-Gevaert would market Quantor systems in Europe, replacing NCR as the European marketer. The companies would not comment on whether this marketing arrangement precipitated the NCR acquisition offer.

Quantor's financial picture, on the other hand, may have been a stimulus to the agreement. Quantor reported a $1.8 million loss of $15.5 million for the nine months ended April 30.

Continuing lags in foreign sales was one of the reasons given by Quantor for poor financial performance. Other factors cited in the losses were a substantial increase in the allowance for doubtful accounts because of "problems collecting from certain small accounts" and a reevaluation of inventory because of "lower than anticipated bookings for the quarter."

Warrants Expired

Although NCR held warrants to purchase up to 400,000 shares of Quantor common stock (at the rate of 200 shares of stock per computer output microfilm system sold), NCR never exercised those warrants and they expired a month ago, Quantor said.

At the present time, according to a Quantor vice-president, NCR holds no common shares in the company.

NCR chairman William S. Anderson said "the acquisition will provide a base for expansion by NCR in the micrographics and related fields" and Quantor's current management would continue after the acquisition.

Hardware Purchases Up $450 Million

IDC Update Lists 2,200 OEM/Systems Houses

WALTHAM, Mass. — International Data Corp.'s (IDC) OEM/Systems House Prospect Data File now lists more than 2,200 companies in a $2 billion marketplace.

The April 1978 edition includes a listing of the top 20 metropolitan areas, which alone account for $986.4 million in hardware expenditures. This is a substantial increase in coverage from the April 1977 edition that showed the top 20 metropolitan areas spent $536.2 million, IDC noted.

Metropolitan New York and Los Angeles lead the list, spending $175.8 million and $166 million respectively for hardware.

The average selling price of marketed systems dropped, according to the update. Last year 27% of the companies surveyed priced their systems from $1,000 to $24,000; a year later 30% of those surveyed price their systems in this range.

However, the higher priced systems — more than $50,000 — showed no changes, IDC said.

Survey respondents most frequently marketed to the end-user segment or the manufacturing, general business, health care or government sectors, IDC noted.

The most frequently reported applications were general business, accounting, communications and process control.

The companies surveyed purchased Digital Equipment Corp. and Data General Corp. minicomputers most frequently (65%), with Hewlett-Packard Co. and Interdata, Inc. trailing with 8% and 7% market shares respectively.

In the microcomputer segment, the 1978 update showed a 200% increase in the number of micro purchasers, rising from 542 firms last year to 1,137 firms this year. Intel Corp. still holds the greatest share of the micro market (45%), followed by Motorola Corp. (22%) and DEC (12%).

The data file is specifically designed to meet the product and market planning needs of hardware vendors selling minis, micros and peripherals, computer service companies, supply companies and third-party leasing firms.

More information on the OEM/-Systems House Prospect Data File can be obtained from IDC, 214 Third Ave., Waltham, Mass. 02154.

Executive Corner

• Digital Equipment Corp. has created three corporate staff positions, naming Winston R. Hindle vice-president of corporate operations, Andrew C. Knowles III vice-president of corporate marketing and William H. Long vice-president of corporate planning. The company also realigned its marketing organization into three groups: the Computer Products Group, headed by Vice-President Stanley C. Olsen, the Technical Products Group, headed by Vice-President John Leng and the Commercial Products Group, headed by Vice-President Julius Marcus.

• Thomas E. Barker has been named vice-president of Western Union Teleprocessing, Inc, and general manager of Western Union Information Systems.

• Dale L. Reistad has been elected chairman of the board and chief executive officer of Payment Systems, Inc.

• Joseph A. Boyd has been elected chief executive officer of Harris Corp.

• R.J. Taylor has been named president of ICL, Inc.

• Walter B. O'Neil has been elected vice-president of Hazeltine Corp.'s Washington office.

• Robert Leis has been appointed chairman of the board while Susan Willow has been appointed president and Ronald Buck has been appointed vice-president at Omicron, Inc.

• Edward Balinsky has been elected president of Calldata Systems, Inc. and chairman of the board of Calldata Federal Services, Inc.

• Joshua I. Smith has been named president of the Maxima Corp.

• Allen D. Feener has been appointed vice-president of marketing for the Equimatics Division of Informatics, Inc.

• Martin Goldstein has been elected vice-president and controller of DPF, Inc.

• Michael R. Vitale has been named director of marketing at DTSS, Inc.

• Frederic H. Sweeny has been elected vice-president of marketing at Computer Optics, Inc.

• Richard F. Taylor has been named vice-president and general manager of Okidata's Eastern Division.

• Donald A. Graham has been appointed president and chief operating officer for Microdata Corp.'s domestic operations.

• Walter M. Schramm has been promoted to vice-president of marketing and business development for Basic/-Four Corp.

• Dennis J. Reardon has been appointed national sales manager of computer systems at National Semiconductor Corp.

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Tesdata Tops Record With Quarter Revenues

McLEAN, Va. — Tesdata Systems Corp.'s President Thomas E. Stone reported that revenues for the second quarter were the best in the company's history, "but significantly increased expenses resulted in lower profit margins during 1978."

Revenues for the first quarter topped $4.6 million compared with $3.4 million in the year-ago period.

Tesdata's quarter earnings totaled $441,000 or 35 cents a share, down 10% from last year's second-quarter earnings of $486,000 or 41 cents a share.

Six-month revenues reached $8.7 million, up from $6.7 million a year ago. But earnings dropped to $858,000 from the $879,000 reported for the first six months of 1977.

Stone noted the principal increases in expenses were for selling and research and development. "Our R&D costs are running more than twice what they were at this time last year, as we have stepped up our programs to get new products to the marketplace this year," Stone said.

"The increased selling expenses reflect significant expansions of our direct field marketing and customer support staffs," he continued. "In addition, we experienced certain nonrecurring expenses associated with the announcement of new products in June."

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In First Six Months

Memorex Earnings Growth Slow

SANTA CLARA, Calif. — Memorex Corp.'s growth in earnings for the first six months of fiscal 1978 compared with last year's earnings has totaled 5% — low when compared with its 40% growth in revenues.

In commenting on the performance, Robert C. Wilson, president and chief executive officer, noted second-quarter profits continued to be negatively impacted because of expenditures for the Memorex vs. IBM antitrust trial, integration of the Telex-Europe acquisition and the costs associated with the introduction of new products.

"The impact of these negative factors should be less in the second half of the year," he added.

Second Quarter Earnings

Earnings for the second quarter were $13.5 million or $1.96 a share, including a tax-loss carryforward of $3.3 million or 53 cents a share.

Earnings in the comparable 1977 period were $13 million or $2.06 a share, which included an extraordinary credit of $5.1 million or 83 cents a share.

Revenues for the second quarter totaled a record $158.5 million, a 47% gain on 1977 second-quarter revenues of $108.2 million.

Earnings for the first half of 1978 totaled $27.9 million or $4.04 a share, up 5% from earnings of $26.6 million or $4.01 a share in the 1977 six months. These figures also reflect extraordinary credits.

Cash and temporary investment balances at quarter's end were $8.2 million compared with $9.2 million last quarter and $37.6 million on June 30, 1977.

Total debt increased $16.6 million during the quarter to $163.9 million from $147.3 million last quarter.

Financial News

Cray Results in the Black For Quarter, Six Months

MINNEAPOLIS — Cray Research, Inc. reported second-quarter revenues of slightly more than $3 million, bringing total revenues for the first six months to $4.3 million. This compared with revenues of $527,000 in the first quarter of 1977 and $1 million for the first six months of 1977.

Earnings for the second quarter rose to $410,449 or 25 cents per share before extraordinary items, compared with a loss of $634,206 or 45 cents a share in the second quarter a year ago.

For the six-month period, earnings before extraordinary items totaled $199,543 or 13 cents a share, gaining on last year's half-year losses of $1.1 million or 80 cents per share.

John A. Rollwagen, Cray president, said the profitable operations resulted from the direct purchase of $1.1 million of peripheral equipment for a Cray-1 leased system.

In addition, two Cray-1 mainframes at the U.S. Department of Defense and the University of California's Lawrence Livermore Laboratory began producing revenue during the second quarter as a result of completion of acceptance testing.

Agreement in Principle

Moreover, Cray reported that during the second quarter it received an agreement in principle from the UK's Ministry of Defense to acquire a million-word Cray-1.

The company also received notification from United Computing Systems, Inc. confirming its intent to order a second Cray system valued at about $8 million, with delivery slated for fourth quarter of 1979.

Earnings at Decision Data Top Past Period Records

HORSHAM, Pa. — Decision Data Computer Corp. reported second-quarter earnings of $399,000 or 11 cents a share compared with $282,000 or 8 cents a share in the comparable year-ago period.

Revenues for the second quarter were $9.2 million compared with $8.5 million in the previous year's second quarter.

Six Month Earnings

For the first six months of 1978, earnings totaled $531,000 or 14 cents a share compared with $517,000 or 14 cents a share a year ago. Revenues for the corresponding six-month periods in the two fiscal years were $17.5 million and $16.4 million, respectively.

Louis H. Benzing, president, observed that "the company's profits in the second quarter and in the first months were the highest reported in the company's history. This record performance results from a combination of tight budget control and increased revenues."

The firm is proceeding with its plan to utilize its nationwide sales and service organization to maintain its installed lease base and introduce products.

"In support of this emphasis on new products, the research and development expenditures in the first half were approximately double that expended in the first half of 1977," Benzing said.

Earnings Up 23% In CSC Quarter

EL SEGUNDO, Calif. — Computer Sciences Corp.'s (CSC) earnings for the first quarter rose 23%, totaling $3.9 million or 28 cents a share compared with $3.1 million or 21 cents a share in the year-ago period.

Revenues gained 18%, reaching $76.2 million from $64.1 million in the 1977 period.

Contract Services Up

Contract services accounted for $54.2 million of the revenues, up from $46.1 million in last year's first quarter. Data services, which include operations of CSC's Infonet timesharing network, generated revenues of $22 million compared with $18 million a year ago.

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Investment, Debt Restructure

CDC, Scan-Data Finalize OCR Marketing Pact

NORRISTOWN, Pa. — Scan-Data Corp. has finalized a previously announced agreement in principle with Control Data Corp. [CW, May 22] whereby CDC will invest in Scan-Data, which in turn will assume U.S. marketing responsibility for CDC optical character recognition (OCR) products.

In addition, CDC will provide certain manufacturing and service support for Scan-Data's Positran Fast Food Order Entry and Operations Control System and allow Scan-Data to use its Washington, D.C., laboratory for OCR-related research and development.

In commenting on the arrangement, Robert R. Burns, president of Scan-Data, said "the purpose of the business arrangement is to use each other's capability to the best advantage. One thing [Scan-Data] has that [CDC] doesn't is a relatively small size and a dedication to one market segment."

CDC has purchased 5,000 shares of Scan-Data's nonvoting preferred stock which are convertible at CDC's option to a total of one million shares of Scan-Data common, Scan-Data said. Scan-Data presently has approximately 2.2 million shares of common outstanding, and if CDC takes advantage of its option, it could eventually control slightly more than 30% of Scan-Data's outstanding common shares. Burns claimed there had been no discussion of CDC's acquisition of Scan-Data.

Other Arrangements

Scan-Data has completed several other arrangements that were conditions of the agreement with CDC, primarily related to restructuring the company's debt, Burns noted.

The restructuring of debt has eased the debt burden incurred by Scan-Data over the years. Burns said that during 1973-1975, the company borrowed heavily for growth and later suffered operating reversals. "We had become so over-leveraged that at one point we were down to one-half million in shareholders' equity with $7.5 million in bank debt."

Holders of $650,000 of Scan-Data's subordinated notes, due March 31, 1980, have agreed to exchange their notes for an aggregate of 359,000 shares of Scan-Data common stock. Moreover, the holder of $100,000 of the firm's Series A preferred stock has agreed to change its stock for 52,000 shares of common stock.

Furthermore, Scan-Data transferred its four data entry service centers and certain other assets to a new company, Scan-Data Data Center Corp., which has assumed all financial obligations including $4 million of Scan-Data's indebtedness to its commercial bank.

The stock in the new company was sold to Robertson Financial Corp. of Brielle, N.J. Under this arrangement, Scan-Data has realized a profit of about $2.3 million, the company said, adding that it will continue to manage the data centers receiving a fee and a portion of the new company's net cash flow.

Scan-Data said its commercial bank has restructured its remaining indebtedness of about $2.9 million as a five-year term loan and granted a one-year revolving credit line of up to $1.5 million.

Along with the eased debt position, Burns said Scan-Data is expecting increased revenues this quarter from OEM shipments of its Model 410 to NCR. This kind of business, Burns said, requires only manufacturing capability with virtually no sales support.

Negotiations with CDC started seriously in 1976, when Burns attended an OEM executive seminar in Minneapolis and heard William C. Norris, CDC's chairman and chief executive officer, affirm CDC's policy of cooperating with smaller companies for mutual business advantage. Scan-Data subsequently approached CDC with a proposal.

New Registrations

COMPUTER COMMUNICATIONS, INC., 2610 Columbia St., Torrance, Calif. 90503, has filed to register 503,446 shares of common stock to be offered by the company and 346,554 shares of common stock to be offered by certain selling shareholders, including all of the holdings of Memorex Corp. The total offering will be made through a group of underwriters formed by Allen & Co., Inc.

TELENET CORP. has filed to register 400,000 shares of common stock. The underwriter for the offering is L F Rothschild, Unterberg, Towbin.

RANDAL DATA SYSTEMS, INC., 365 Maple Ave., Torrance, Calif. 90503, a small business systems firm, has filed to register 330,000 shares of capital stock. Underwriter, C.L. McKinney & Co., Inc.

ITEL CORP., One Embarcadero Center, San Francisco, Calif. 94111, has filed to register 1,000,000 shares of common stock. No underwriter is involved.

WAVETEK, 9045 Balboa Ave., San Diego, Calif. 92123, has filed to register 110,000 shares of common stock. No underwriter is involved.

CULLINANE CORP., 20 Williams St., Wellesley, Mass. 02181, a packaged computer programs firm, has filed to register 330,000 shares of common stock. Underwriter, Hambrecht & Quist.

T-BAR, INC., 141 Danbury Road, Wilton, Conn. 06897, a data communications equipment firm, has filed to register 149,200 shares of common stock. No underwriter is involved.

HONEYWELL, Inc., Honeywell Plaza, Minneapolis, Minn. 55408, has filed to register 429,558 shares of common stock. No underwriter is involved.

APPLIED DIGITAL DATA SYSTEMS, INC., 100 Marcus Blvd., Hauppauge, N.Y. 11787, has filed to register 60,000 shares of common stock. No underwriter is involved.

COMPUCORP, 1601 S. Bundy Drive, Los Angeles, Calif. 90025, has filed to register 22,000 shares of 9.4% sinking fund debentures, due 1983 with detachable warrants to purchase common stock. Underwriter: Investors Financial Services, Inc.

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  (Opportunities in Detroit, Los Angeles, Minneapolis, San Francisco Bay Area, Seattle, and Washington, Dc.)
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New York, N.Y. 10038

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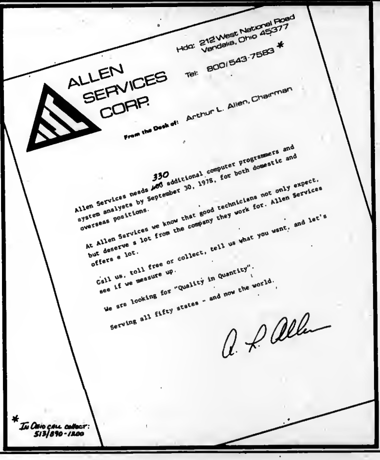

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★ Advanced Micro Computers ★

A Brand New Company With A Solid Foundation

AMC is the offspring of Advanced Micro Devices a $100 million leader in the semiconductor industry, and Siemens AG, on of Germany's largest corporations and $12 billion a year giant in the electronics industry. AMC is aggressively going after the high performance microcomputer market with microprocessor based development systems, microcomputer boards for OEM use and of course the necessary software.

We are looking for people who are interested in bringing state-of-the-art software to microprocessors.

AMC is based in Santa Clara, California in the San Francisco Bay Area where the weather is beautiful 365 days a year and exceptional recreational areas are available year around.

We have openings in the following areas:

Operating Systems Programmer/Analysts

Five years experience in the design and development of multi-user, multi-programming operating systems. Areas include real-time, scheduling, file management,, interactive communications, and peripheral device control. Positions are available at Senior and Associate levels. A BSEE in Computer Science or equivalent is required.

Compiler Designers

Five plus years experience in high-level language compiler design. Experience with compiler development for PASCAL, PL1, and other system development languages, FORTRAN, BASIC, and COBOL. Mini and/or micro computer experience desirable. Candidate must be capable of bringing state-of-the-art language capability to the high performance micro computer environment. Degree required.

Support Software Engineer

Two to five years experience in maintenance of operating systems, system utilities, or microprocessor applications software. Must have experience in assembly language, with systems development language experience, such as PL1 and PLM, desirable.

Diagnostic System Programmer

At least five years experience in diagnostic systems satisfying, manufacturing, engineering and field service needs. Knowledge of microprocessor hardware, and related controllers and peripherals such as Disk and Diskettes, is a must.

CALL COLLECT
(408) 737-7755

Monday thru Friday 9AM to 5PM

Advanced Micro Computers has a lot to offer you...benefits which are outstanding in the industry, including complete dental and medical insurance, educational assistance program, a new solar heated building which includes enclosed offices, making for an ideal working environment, plus much more. Call Dennis Etienburg at the above number now, or send your very confidential data sheet to: 901 Thompson Place, Sunnyvale, California 94086. An equal opportunity employer male/female/hanicapped. COMPLETE RELOCATION ALLOWANCE GIVEN

Advanced Micro Computers
An affiliate of Siemens
901 Thompson Place o Sunnyvale, CA 94086

Equal Opportunity Employer M/F/H

LINOLEX PROGRAMMERS

TEXT EDITING

To design and implement the various software modules necessary to build a family of video-based text editing systems. We are looking for talented applications programmers with 2-5 years assembler language experience who can communicate effectively & enjoy a team environment. Background in mini-computers or text-editing applications a definite plus.

COMMUNICATIONS

To assist in the development of a multiple processor, multiprotocol terminal simulation package which will operate with a variety of domestic and foreign mainframes. Applicants should have 1-4 years assembler language programming experience, knowledge of I/O drivers and interrrupt handlers, and either expsoure to data communications or a strong desire to learn. Some hardware background would be a plus.

CALL US AT 617-275-1420

For day or evening interviews
or send a confidential resume to:

3M Company, Terry Stapleton
Crosby Drive, Bedford, MA, 01730

An Equal Opportunity Employer M/F

3M

Software Engineers

Excellent opportunity for qualified individuals to join the world recognized leader in photographic innovation. Candidates we select must be able to apply computer controls, communications, data base management and OR techniques, to process systems and will be given responsibility for developing systems to maximize operating efficiency and product quality of our unique chemical batch and film coating processes.

Polaroid has a dynamic, people-oriented working environment located south of Boston, in a fast-growing community near many popular ocean resorts. We also offer a good deal of professional interaction to meet the challenges and achieve the benefits of continued growth. And to meet the requirements of our long range plans, rapid expansion of our technical staff is now underway.

Senior Software Engineers

Work within the Technical System Group at our New Bedford Negative Manufacturing Facility. Primary responsibilities include: designing, writing, implementing, and documenting application programs for the Foxboro PCP 88 Control and DEC's PDP11 Series Systems. Excellent communications skills mandatory. Must be able to train plant personnel including: process operators, program users, process engineers and instrumentation people in the proper usage of computerized plant functions. Applicant must have a thorough knowledge of operating systems, device drivers, process control and control theory. A BS degree with at least four years of experience or an MS degree with at least three years experience in development and installation of software systems is required. Project leadership skills along with well developed analytical abilities are highly desirable.

Software Engineers

A BS degree with at least two years of experience or an MS degree with at least one year of experience in the above described disciplines would qualify you for the Software Engineering positions.

Qualified applicants for the above positions should forward a resume, complete with salary history to Rick Bates, Polaroid Corporation, 100 Duchaine Boulevard, New Bedford, Massachusetts 02745.

An equal opportunity employer M/F

Polaroid

DATA PROCESSING PROFESSIONALS

With us, it is not only your career...it's OURS

Our business is the procurement, distribution, and wholesaling of consumable food and related products. It's a business that we know and in which we excel ... where our very ability to function is tied to data processing systems. Our Information Systems Group functions as an integral part of our management team. They reflect the vitality, expertise, and professionalism of our entire organization. We have such an organization because we learned long ago that if we provided careers for our associates, they would provide the profitability and growth. At Fleming it is not only your career ... it's OURS.

PROGRAMMERS

We presently have immediate openings in our Topeka Information Systems Groups for Senior Programmer Analysts. Three to five years programming experience required. Expertise in COBOL mandatory. Prefer work in DOS/VS environment on IBM equipment. We offer challenging work assignments, competitive salary and excellent benefit package. Send resume and salary history in complete confidence to:

Diana Hawkins
Fleming Companies, Inc.
P.O. Box 1160
Topeka, Kansas 66601

An Equal Opportunity Employer M/F

Fleming

VALLEY NATIONAL BANK

At Valley National Bank we have a sense of pride in our growth and our state, we are the largest bank in the Rocky Mountain States with over 3 billion in assets and 180+ branches. We are located in a state that offers one of the most desirable locations anywhere.

This sense of pride is carried on in the work our 5000+ employees do for us. Our growth is measured by the success of the people who are Valley National Bank . . . our employees. If you qualify in the following areas . . .

IBM 370/158 & 168, OS/VS, COBOL &/or ALC

* **ATM Project Leader-Mini Computers**
Knowledge of DB/DC systems, communications hardware & systems analyst experience required. Need strong communications skills. Prefer 3-5 years programming experience. ATM/EFTS required.

* **Programmer/Analyst-Terminal Oriented Systems**
Knowledge of D/B systems, systems analyst experience required. Need strong communications skills. Approximately 70% analysis-30% programming involved. Systems usually involve D/B file. Prefer 2+ years programming experience.

* **Programmers/Analysts-Bank Applications Experience**
ILS, CLS, R/E, Charge Card, DDA, TDA, etc. 3-5 years programming experience required.

. . . and would like to become part of our success, then send your resume and salary history to:

Valley National Bank
P.O. Box 71 CW2 B301
Phoenix, Arizona 85004

An Equal Opportunity Employer M/F

VALLEY NATIONAL BANK

VALLEY NATIONAL BANK

Computer Professionals

JOHN DEERE

Deere & Co., a leading manufacturer of agricultural equipment, has openings for the following positions:

SYSTEMS ANALYSTS

You must have a minimum of 2 years experience, including IMS, in an IBM environment, preferably in manufacturing areas. Responsibilities will be varied.

PROGRAMMERS

Prefer a minimum of 2 years experience with IBM equipment and a knowledge of COBOL, PL1, and FORTRAN.

We offer qualified candidates excellent starting salaries and comprehensive company-paid benefits including paid relocation to Iowa. For consideration, direct your inquiry with salary history to:

Ronald H. Lika
Deere & Company
Moline, Illinois 61265

An Equal Opportunity Employer M/F

Bank Service Bureau

PROGRAMMING MANAGER

to 30K

Savings Management Computer Corporation, a leading supplier of on-line data processing service to the New England region seeks an individual with the following qualifications:

- 5-7 years experience in managing software development
- Financial applications design experience
- Experience with IBM large scale equipment and Assembler language.

You will manage application development and support for a complete range of on-line banking services including savings, mortgages, installment loans, CIF, EFT, etc. and will operate in a 360/370 BAL/COBOL environment.

Qualified applicants should submit their resume to:

R. A. Lane
Manager of Administration

SAVINGS MANAGEMENT
COMPUTER CORPORATION
60 Congress Street
Boston, MA 02109
An equal opportunity
employer m/f

Software Engineers

At Honeywell we continue our search for computer professionals who are looking for that "once in a career opportunity". We offer an exciting and challenging work environment in which to begin that career. As a part of the Honeywell team you will need to make a commitment, as we have, to develop the most advanced computer systems on the market.

We are actively searching for top quality computer talent in the following areas:

- ADVANCED OPERATING SYSTEM DESIGN AND DEVELOPMENT (GCOS, MULTICS, etc.)
- DATA BASE AND FILE MANAGEMENT SYSTEMS
- UNIFIED FILE ACCESS SYSTEM (LOGICAL I/O)
- INTEGRATED DATA STORE II — A DATA BASE MANAGEMENT SYSTEM BASED UPON CODASYL SPECIFICATIONS
- DISTRIBUTED PROCESSING AND NETWORKING
- LANGUAGE SYSTEM DEVELOPMENT
- APPLICATION DEVELOPMENT SYSTEMS
- INTERNAL BUSINESS SYSTEMS

If you are ready to make that commitment and want to become a part of our team, send your resume and salary history in confidence to:

Manager, Recruitment & Placement
Mail Station Y-158
Large Information Systems Division
P.O. Box 6000
Phoenix, Arizona 85005

THE SEARCH IS ON

Honeywell

An Equal Opportunity Employer M/F

SALES

EARNINGS POTENTIAL $60,000 +

We need aggressive salespeople with a proven record of important earnings to sell our highly successful interactive-multi terminal disc oriented, debugged software/hardware package designed for a specific and rapidly growing industry.

Experience in selling account and management information systems, applications software very desirable.

Regional opportunities include: CHICAGO, DALLAS, KANSAS CITY, MO., and LOS ANGELES. Write or call Curtis Henderson, 513 North Main St., (Suite 202-5) Conroe, Texas 77301 - (713) 756-2425.

DATALINE CORP.

Another Breen Connecticut Data Processing *EXCLUSIVE*

New 370/NVS corporate data center seeks:

Technical Manager, software MVS Senior Systems Design, database Computer Technologist, performance Senior Systems Analyst, merchandising Programmer Analyst, COBOL OS

Salaries commensurate with experience. Relocation and travel expenses paid. Respond to Toby S. Brimberg.

3780 Whitney Ave.
Hamden, Ct. 06518
(203) 288-7461

Call, clip coupon,
or send your
resume in confidence.

BREEN DATA Division of the Breen Group, Inc

Name__________________________

Address__________________________

City________________State________Zip________

Employer________________Title________________

Position description__________________________

Telephone (   )________________Present salary____________

RPG II PROGRAMMERS

An unmatched opportunity is yours to break out of the small shop with its outdated technology and limitations on your future. Become part of a progressive applications software company offering unlimited growth to talented and ambitious personnel.

The Company: Policy Management Systems is a software sales and facilities management division of Seibels, Bruce & Company, an old, respected property and casualty insurer. PMS has experienced an astounding rate of growth over the past few years and "We've only just begun."

The Location: Columbia, a sunbelt city located in central South Carolina, is a short distance from the beach and the mountains. A fast growing, progressive city, Columbia combines traditional southern living with many cultural and recreational opportunities.

The System: The major PMS system is an online software system used by over 100 property & casualty companies in the US and Canada. The Processing Services Group has customers in 6 states and we are now expanding to meet the market which exists throughout the US and Canada.. The earlier releases of the system still in use by Processing Services Group are primarily DOS RPG II with some COBOL. Our equipment consists of one IBM 370-168 and one IBM 370-148. An OS conversion is underway and should be completed within a year.

The Opportunity: Processing Services Group needs several sharp, experienced applications programmers with a will to advance and improve their technical skills. Our next release of the system (expected soon) is being written in OS structured COBOL. As we convert to that release you will be given the training and experience to make you a programmer of the "80's." We need good people and we need them now. Little (if any) travel is required.

Send resume or letter stating qualifications to:

Richard Dittmar
Processing Services Group
Seibels, Bruce & Co.
P.O. Box 1
Columbia, SC 29202

PMS

SOFTWARE DEVELOPERS

Participate in the continuing development of one of the computer industry's most successful software products—ROSCOE.

Installed at over 500 sites in 20 countries, ROSCOE continues to compete effectively against IBM's TSO and VM/CMS.

Plans are being made to extend ROSCOE into new functional areas. Work with BTAM and VTAM, 3270 display stations, MVS and other OS/VS operating systems.

Now is the time to join the ADR team. You can be a part of this challenging new development effort—from conception through to final delivery. And, you will work with some of the finest programmers in the business in a highly professional environment.

Please send resume with full details including current salary in complete confidence to: Personnel Director, Applied Data Research or call (609) 921-8550.

APPLIED DATA RESEARCH
Route 206 Center, CN-8 Princeton, N. J. 08540

An Equal Opportunity Employer
m/f/h/v

SENIOR PROGRAMMER ANALYST

An excellent opportunity is now available for an aggressive, self starting individual to participate in the development of distributive menufacturing systems. We are looking for 3 to 6 years experience including systems anelyses, Cobol programming using IMS or IMAGE data bases.

Competitive salary and excellent benefits are offered. Send resume to:

E. Abrams
Reliance Electric Company
24701 Euclid Avenue
Cleveland, Ohio 44117
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BUSINESS SYSTEMS PROGRAMMER / ANALYSTS

FLORIDA EAST COAST LIVING

Harris Corporation, with a continuing record of outstanding growth is a well established (Fortune 500) leader in Communications and Information Handling Systems

We are a technology oriented corporetion where individual contribution and technical excellence is highly visible and justly recognized.

Recently established in Melbourne, on Florida's East coast, our Corporete Information Processing Center has several new requirements for Programmer/Analysts. Positions require minimum of 3 years programming with experience in:

... ANS COBOL
... Medium to large scale IBM OS environment
... Financial end/or manutecturing systems
... User documentation

Basic responsibilities will include assisting highly decentralized divisions in the programming and application of business systems software. Requires approximately 25% travel

Local division level positions also exist requiring 2 years experience utilizing COBOL, DATA Base Softwere, Standard Utilities, and Job Controls

Investigate a rewarding Harris career and an enjoyable Florida climate. Our cost of living remains one of the most reasonable in the nation

Please forward a resume in confidence to: R.W. Underill, Harris Corporetion, Controls Division, P.O. Box 430, Melbourne, Florida 32901.

HARRIS
COMMUNICATIONS AND INFORMATION HANDLING

An Equal Opportunity Employer—Male and Female

SYSTEMS PROFESSIONALS
NATIONWIDE SERVICE

Sys Dev Mgr To $38K
Midwest, Mfg Feb or procs industry exp.

Sys Mgr-Ct. To $29K
Stert up, international trvl. Mfg & acctg. epplic.

Con NYC or NJ To $30K
O/S COBOL - CICS or IMS or TSO- Excellent benefits.

O-R-T-U-N-E DATA

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505 5th Av. NYC 10017
(212) 682-8600
Company Inquiries Invited

POSITIONS NATIONWIDE CALL TOLL FREE 800-426-0342

MINI PROGRAMMERS To 25K
Mfg., Financial or Benking experience. Openings Coast to Coast.

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Openings in the Midwest, SW & Calif.

COBOL PROGRAMMERS To 23K
Severel openings.

SYS PROGS To 30K
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SOFT ENGINEERS To 32K
B.S.E.E. plus 3 yrs experience.

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P O Box 12308
Seattle, WA 98111
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WANGWANGWANG

SOFTWARE SALES

Executive Sales

If you can interact successfully with top management of blue chip organizations, you will want to know more about the sales and management opportunities provided by the steady growth of WANG, the leading manufacturer of integrated hardware and software systems.

Executive Sales Support

If you have installed or designed a WANG or other payroll, personnel or benefits system, want more computer involvement and are ready for promotion to a top level slot in a WANG sales team, this is your next position.

Both positions provide highly leveraged incentives and demand moderate local travel. For more information call or write:

Linda G. O'Connor
Career Opportunities
(617) 851-4111

WANG LABORATORIES, INC

One Industrial Ave., Lowell, MA 01851

We are an affirmative action/equal opportunity employer.

Creative, aggressive programmer/analysts are thriving at NCR-San Diego.

If your S/W background qualifies you for a heavyweight role in developing new approaches to interactive, transaction processing financial systems, we'll give you all the independence and creative elbow room you could ask for.

You'll be joining a small (200 people) division that's pioneering bold, imaginative techniques in OS and data communications, and enjoying exceptionally high corporate-NCR visibility. You'll find a loose, easy modus operandi in the stimulating company of top software professional. On top of all that, you'll be working in Torrey Pines - a postcard state park setting that's a mile from the ocean and minutes away from La Jolla and downtown San Diego.

Staff expansion has generated immediate openings in the following areas:

Disk Utility
Disk initialization; sector formatting; strong I/O system software.

Applications S/W
Banking/finance applications; on-line access methods; new development; COBOL 74; data development; report generation.

OS
Process communication; job and task management; job scheduling; resource allocations.

Communication S/W
Telecommunication networking; network configuration; configuration management.

I/O Driver S/W
Physical level I/O; control S/W for variety of new peripherals.

Please send detailed confidential resume and salary history promptly to: Cesar Nanba, Dept. S50 NCR Corporation, Engineering/Torrey Pines, 4045 Sorrento Valley Blvd., San Diego, CA 92121.

An equal opportunity employer

NCR
Complete Computer Systems

Programmers-Analysts

REAL TIME APPLICATIONS ON DG NOVA/ECLIPSE DEC PDP 11

Control Applications, Inc. (CAI) needs quality data processing people to support our private industry customers in the areas of Real-Time Data Acquisition, Supervisory Control, and Process Control. Minicomputer experience is desirable along with a solid background in assembly language.

We can offer challenging opportunities for the person who desires to help serve our customers in the areas of:

- SPECIFICATION DEVELOPMENT
- PROGRAM DEVELOPMENT
- SYSTEMS MAINTENANCE
- SYSTEMS INTEGRATION, TEST, INSTALLATION

CAI is a young, fast growing software/system consulting company involved with the design and implementation of turnkey supervisory control systems for the energy related industry. Located between Houston and Galveston, Texas, close to sailing and water sports, CAI offers excellent working conditions, company benefits, and competitive compensation. Please call Diana Bush at (713) 488-8361 to discuss your qualifications or send your resume to:

CONTROL APPLICATIONS INC.
17250 EL CAMINO REAL • HOUSTON TEXAS 77058 • PHONE (713) 488-8381

CAI is an Equal Opportunity Employer M/F

PROGRAMMING

COMPILERS • LANGUAGE DESIGN OPERATING SYSTEMS SYSTEM & NETWORK ARCHITECTURE

Dynamic growth in our wagering, point-of-sale and retail systems has created these career opportunities.

We are the area's only major computer systems development and manufacturing organization and an international leader in our special field. We use the most advanced hardware and software technologies to create and produce uniquely tailored real-time on-line transaction processing systems within a network environment of minicomputers, micro-processors and intelligent terminals.

To maintain our state-of-the art posture, we are developing a new generation of systems software and software development tools. This challenging task requires outstanding individuals with demonstrable competence in one of our areas of activity. Either strong experience or an advanced degree in an applicable area will be given consideration. Areas of specialization include language and compiler design, compiler optimization, network design, operating systems and simulation and modeling.

In addition to the extraordinary technical challenge these positions represent, we have an excellent compensation program, liberal and comprehensive benefits including a tuition plan, and an open end flexible working environment.

If you regard yourself as well above the average in technical competence and want to play a major role in design decisions for our new transaction processing system, please call Ms. D. Lindsey, COLLECT at (301) 666-8700 between 9AM and 4PM or send your resume with salary requirements in confidence to Ms. D. Lindsey, Advanced Systems Development at

GENERAL INSTRUMENT CORPORATION
DATA SYSTEMS & SERVICES GROUP
11126 McCormick Road
Hunt Valley, Maryland 21031
An Equal Opportunity Employer M,F

Considering A Move?

Consider Montgomery County, Maryland*

Montgomery County Government has seven openings for experienced programmer/analysts who desire challenge and opportunity in a modern growing organization.

Our centralized Management Information Department is part of a local government larger than that of eight states. We have over 50 applications in production or under development, including financial management, criminal justice, vote tabulations, and real property assesment and taxation.

Our sophisticated facility has an IBM 370-148 operating under OS/VSI and IMS/VS in batch and teleprocessing modes. We also have distributed processing using IV Phase equipment and on-line program development.

Positions are available at various levels. Minimum requirements are a Bachelor's Degree and two years experience. Direct Data processing experience may be substituted for education on a year-for-year basis. Programming experience in COBOL and OS-Job Control language is desirable. We are an equal opportunity employer. Women, minorites, and handicapped persons please apply.

Montgomery County offers excellent benefits and competitive salaries commensurate with education and experience.

If you're considering a move, give us an opportunity to consider you.

Send a resume by September 5 to:

MONTGOMERY COUNTY
GOVERNMENT
PERSONNEL OFFICE
100 MARYLAND AVENUE
ROCKVILLE, MARYLAND 20850
ATTN: RANDOLPH HILTON

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* Montgomery County sits on the banks of the Potomac River, just minutes away from Washington, D.C., the Nation's Monuments, the Smithsonian Institution, and the Kennedy Center for the Performing Arts. Yet it has the comforts and convenience of a prestigious suburban community with a high quality of life, excellent schools, and outstanding professional career opportunities.

Software Development

Career Opportunities At Our Modern Systems Center

FISCHER & PORTER, a world leader in process control for over 40 years, has an immediate need for Computer Scientists to work on key development programs at our newly acquired Systems Center in Horsham, Pa., a suburb of Philadelphia.

You will play a vital role in this expanding area of our company, while availing yourself of the opportunity to broaden your expertise in the latest software techniques.

To qualify for one of these positions you should have either a BS or MS Degree in Computer Science, Engineering, Mathematics, Physics or the equivalent and experience in the following areas:

- **Software development using a UNIX facility**
- **Systems Programming: RSX-11M/S - VORTEX**
- **Advanced Programming Methodologies**
  - **Structure design, Programming**
- **Distributed Systems Technologies**
  - **Distributed data base management systems**
  - **Distributed control**
  - **Network Architectures**
  - **Network Protocols**
- **Process Control Algorithms**
- **Interactive Computer Graphics, man-machine interface**
- **Microprocessor-based Subsystems**
- **PDP-11 - LSI-11 - 8080 - VARIAN V77 Experience**
- **High Level Languages (PASCALC, ALGOL)**

We can offer you an excellent salary, a complete benefits package, a highly professional environment and an opportunity for career advancement.

Our Systems Center is surrounded by a number of attractive communities offering excellent schools, shopping and cultural activities, plus the advantage of nationally known resort areas such as the Pocono Mountains and the New Jersey Seashore, within a convenient drive.

To apply for one of these positions, please send your resume with salary history to: Mr. T.J. Haines, (Dept. CW), FISCHER & PORTER COMPANY, E. County Line Road, Warminster, Pa. 18974, or call (215) 674-6022 for further information. An Equal Opportunity Employer, M/F.

FISCHER & PORTER

GROWTH WITH A PURPOSE
through worldwide excellence in instrumentation

WANG
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Software Technical Writers

WANG is looking for software technical writers to document our new state-of-the-art 2200VS computer system. We need people with the technical ability to understand the various facets of a modern computer system and the writing ability to explain them clearly and coherently to others. We offer plenty of growth potential and the opportunity to work in a creative, challenging environment where individual achievement is recognized and rewarded. Our requirements are:

- Knowledge of at least one high level language, preferably COBOL, BASIC, or RPG II. (Knowledge of an Assembler language would be a plus.)
- Familiarity with a major computer operating system
- 1-3 years experience documenting or working with system software (programmers with a flair for writing are invited to apply).
- The initiative and creativity to follow a project through from initial research to final copy.

If you meet these requirements, we'd like to talk with you.

Excellent salaries and earning potential plus superior company benefits. Please send resume including academic background and salary history and requirements to:

Linda G. O'Connor
Career Opportunities
(617) 851-4111

WANG
LABORATORIES, INC.
One Industrial Avenue
Lowell, Massachusetts 01851
We are an equal opportunity/
affirmative action employer.

MAIN

CHAS. T. MAIN INT'L, INC.

has immediate openings in DATA PROCESSING for short- and long-term assignments in Iran for:

1. DATA BASE ADMINISTRATOR

Heavy experience in design and maintenance of data base for large-scale CDC equipment.

2. TRAINING SPECIALIST

Experienced analyst capable of training users in CDC cobol and operating systems.

3. APPLICATIONS SYSTEMS DESIGNERS

Experienced designers required for cost accounting, inventory control and administrative systems.

4. APPLICATIONS SYSTEMS ANALYSIS

Heavy cobol experience with some prior design experience.

5. SYSTEMS PROGRAMMER

Experienced in hardware and operating systems on both large and mini computer systems.

6. COMMUNICATIONS SPECIALISTS

Experienced in design of computer networks and data communications. Heavy experience in assembler language required.

These positions offer an excellent salary and benefit package.

If you are qualified and interested, send your detailed resume and availability in complete confidence to:

Mr. Paul S. Mormino, Vice President
CHAS. T. MAIN INTERNATIONAL, INC.
PRUDENTIAL TOWER
BOSTON, MA 02199

An equal opportunity employer M/F

Data Processing Professionals

AUERBACH PUBLISHERS INC., the foremost authoritative source of computer, data processing, data communications and management reference material in the world, has a key managerial opening in its Editorial Department for an individual with a working knowledge of minicomputers. Must have analytical, organizational and good writing skills and be able to work in a deadline environment.

We offer an excellent salary, benefits and a highly professional and stimulating environment. For prompt consideration, send resume and salary history, in confidence to:

Kathleen Murphy

Auerbach Publishers Inc.
Philadelphia Operations Center
6560 North Park Drive
Pennsauken, N.J. 08109
Equal Opportunity Employer M/F

AUERBACH

DATA PROCESSING EXECUTIVES

IF YOUR PRESENT SALARY EXCEEDS $20,000 PER YEAR AND YOU HAVE 5 OR MORE YEARS OF EXPERIENCE IN MANUFACTURING AND SERVICES, BANKING, DIVERSIFIED FINANCE, INSURANCE, TRANSPORTATION, RETAIL, OR UTILITIES AND WOULD LIKE TO HAVE YOUR CAREER HANDLED BY PROFESSIONALS, SEND YOUR RESUME WITH PRESENT SALARY TO:
(CLIENT COMPANIES PAY ALL FEES)

PERSONNEL RESEARCH, INC.
P.O. BOX 175
SARASOTA, FLORIDA 33578

PROGRAMMER/ANALYSTS

MINI COMPUTER PROFESSIONALS PDP/11

Project Managers and
Jr&Sr Prog Analysts
RSTS-E BASIC PLUS

We are a well established, publicly held data processing services organization with an outstanding record of growth and achievement. Due to rapid expansion of our "Turn Key Mini Computer" Business Systems Division, we are seeking professionals for our North Jersey Division.

We are looking for:

3+ years experience working on DEC PDP-tt under RSTS-E and Basic Plus. Should have solid experience with commercial applications to include inventory control, Sales Order Entry, Billing, Accounts Receivable, and General Ledger or any related Mini background.

We offer:

- High visibility career with a leader in the industry.
- Professional working environment.
- Opportunity to get involved in the complete project approach from conception to finish (including Hardware, Software and Training). Hands-on opportunity to do in-house development work on our own PDP 11-34 under RSTS-E Basic Plus.
- Complete benefits package, and full tuition refund.
- Highly competitive salaries.
- Relocation expenses paid.

Above all, we have made a total commitment to the Mini Computer Field. If you have done the same and fit the above qualifications, please call Mr. Bob Palmieri, Director of Personnel at (212) 37t-9600 or rush resume to his attention:

COMPUTER HORIZONS CORP.
747 Third Ave., New York, N.Y. 10017
An Equal Opportunity Employer M/F

SENIOR INTERNAL AUDITOR EDP

We have an immediate opening for a Senior Auditor with two to three years' experience in EDP auditing.

Applicants must have a degree in Accounting.

Basic responsibilities include establishing, maintaining and conducting audit programs relating to EDP systems to determine the adequacy of documentation, the proper application of internal control procedures, and the accuracy of reports. Limited travel.

We offer a stimulating work environment, excellent growth potential and a comprehensive benefit package. Salary commensurate with experience.

Please send resume for confidential resume to.

Mrs. Pearl R. Evans
Senior Consultant
Employment and Employee Relations

STATE MUTUAL OF AMERICA
MEMBER OF THE AMERICA GROUP
440 Lincoln St.
Worcester, MA 01605
An Equal Opportunity Employer M/F

SENIOR PROGRAMMER ANALYSTS

Due to internal promotions, the Farm Credit Banks of Louisville, is looking for 3 Senior Level Data Processing Professionals who are willing to extend the effort to help us implement an aggressive systems upgrade program. We need assistance in several application areas including loan accounting.

We have recently installed an 1 tel AS-5 using COBOL under VS-1. We have created an environment that will allow you to be creative using ROSCOE. Your results will be recognized and rewarded. Our employees do not get lost in our organization.

We offer exceptional benefits and a salary commensurate with experience. If you wish to be part of this progressive team, forward your resume in confidence to:

FARM CREDIT BANKS
P.O. Box 32660
Louisville, KY 40232
Equal Opportunity Employer

The Importance of Educational Services

At Digital, our Educational Services Group is a very important element with high priority. As one of the world's largest and fastest growing computer manufacturers, Digital Equipment Corporation emphasizes the importance of communicating to customers and employees, instructions and training relevant to current and new technological advances. Within the dynamic Digital environment you can find outstanding career opportunities and rewards. Right now our Educational Services Group has excellent openings for individuals with the following backgrounds:

Software Course Developers and Instructors

We currently need individuals to instruct and develop a broad range of advanced software course material required for the support of both current and future products. If you have a background in systems analysis, systems programming, operating systems support, telecommunications, programming languages, diagnostic programming, data base management, or software course development and teaching, we would like you to consider this unique opportunity to broaden your technical background while communicating your expertise.

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This is an excellent opportunity for qualified hardware professionals to develop or teach courses to instruct our field service engineers and customers on how to install, maintain, and repair our equipment. Ideally you will have teaching, computer, and peripheral maintenance experience. However, we are equally interested in professionals who have computer hardware experience, good interpersonal and communication skills, and a desire to teach or to become involved in course development.

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If you're looking to broaden your career horizons, the wide exposure, technical challenge, and excellent growth potential of one of the largest training organizations in the computer industry is for you! Please forward your resume to Mary Ann Joyce, Digital Equipment Corporation, Dept. H814 3807, 129 Parker Street, Maynard, Massachusetts 01754. We are an equal opportunity employer m/f.

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SR. SYSTEMS ANALYST/PROJECT LEADER. MS degree. In-depth experience in systems analysis, data base/decision table design, feasibility studies, user interface. Knowledge of Fortran, APL programming languages. Possesses unusually keen insight. $24,000. Contact Robert Half Personnel Agencies, 522 Fifth Ave., NYC 10036. (212) 221-6500.

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SYSTEMS ANALYST - Graduate with a minimum of two years analyst experience with programming background. Prefer on-line experience (CICS, IMS) and data base. Construction Management Systems experience a plus.

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Cornell University is located in a small city in the central New York Finger Lakes region. We offer a liberal fringe benefit program.

Send resume to, or call: Scott Outlaw, Computer Services, 246 Langmuir Lab, Cornell University, Ithaca, New York, 14853 - (607) 256-7113.

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These positions are in the Career Civil Service. Level of pay will vary from grades GS-7 to GS-12 depending upon education and experience.

Send your resume or SF-171 to: U.S. Bureau of the Census, Personnel Division, Rm. 3227 B-3, Washington, D.C. 20233, Attn: M. Lam. An EOE M/F.

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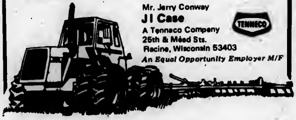

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Challenging work in a professional environment with excellent advancement opportunity make this position attractive. Compensation commensurate with ability and experience, includes a bonus and excellent fringe benefits.

Send detailed resume to:

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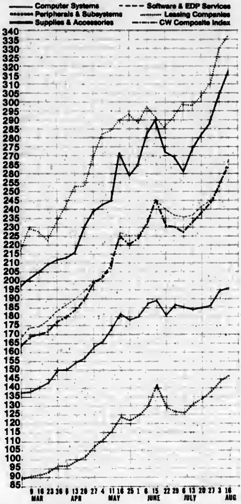

Earnings Reports

COMPUTER HORIZONS
Year Ended Feb. 28

	1978	1977
Shr Ernd	$.61	.....
Revenue	8,858,711	$3,896,465
Earnings	300,509	117,765

DATA GENERAL
Three Months Ended June 3

	1978	1977
Shr Ernd	$.93	$.68
Revenue	99,491,000	60,507,000
Earnings	9,337,000	6,780,000
9 Mo Shr	2.60	1.99
Revenue	245,374,000	197,143,000
Earnings	25,969,000	18,711,000

INFORMATION INTERNATIONAL
Year Ended April 30

	1978	1977
Shr Ernd	$.50	$.78
Revenue	13,199,215	15,114,513
Earnings	1,328,712	2,006,222
3 Mo Shr	.16	.18
Revenue	3,989,760	3,816,870
Earnings	435,470	461,507

MANUFACTURING DATA SYSTEMS
Three Months Ended May 31

	1978	1977
Shr Ernd	$.35	$.26
Revenue	8,370,000	778,000
Earnings	1,057,000	6,370,000
9 Mo Shr	.77	.56
Revenue	20,991,000	15,841,000
Earnings	2,327,000	1,660,000

MICRODATA
Three Months Ended May 31

	1978	1977
Shr Ernd	$.53	$.24
Revenue	18,110,000	8,032,000
Earnings	1,178,000	532,000
9 Mo Shr	1.25	.55
Revenue	44,516,000	27,235,000
Earnings	2,798,000	1,227,000

TELEX
Year Ended March 31

	1978	1977
Shr Ernd	$.78	$.58
Revenue	140,460,000	118,272,000
Tax Cred	4,700,000	3,030,000
Earnings	8,454,000	8,265,000

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TRADE QUOTES

Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, AUGUST 9, 1978

All statistics compiled, computed and formatted by
TRADE QUOTES, INC.
Cambridge, Mass. 02139

COMPUTER SYSTEMS

EXCH		1978 RANGE (1)	CLOSE AUG 9 1978	WEEK NET CHNGE	WEEK PCT CHNGE
A	AMDAHL CORP	28- 58	47 7/8	+3 1/4	+7.2
N	BURROUGHS CORP	39- 83	82 3/8	- 1/8	-0.1
O	COMPUTER AUTOMATION	23- 41	41	+1 3/4	+4.4
N	CONTROL DATA CORP	23- 41	40 7/8	+ 1/8	+0.3
O	CRAY RESEARCH INC	21- 33	33	0	0.0
N	DATA GENERAL CORP	42- 88	67 3/4	+ 1/4	+0.3
N	DATAPOINT CORP	34- 86	66 1/8	+1 3/4	+2.7
N	DIGITAL EQUIPMENT	39- 54	30 3/4	-2 3/4	-3.1
N	ELECTRONIC ASSOC.	2- 8	7 1/4	- 3/8	-4.9
A	ELECTRONIC ENGINEER.	11- 19	13 3/4	+1	+7.8
O	FOUR-PHASE SYSTEMS	19- 38	37 1/2	+1 3/8	+4.3
N	FOXBORO	28- 40	39	+ 3/8	+0.9
O	GENERAL AUTOMATION	7- 24	23 1/2	+2 1/4	+10.3
O	GRI COMPUTER CORP	1- 1	1	0	0.0
N	HEWLETT-PACKARD CO	82- 90	89 1/2	+1 7/8	+2.1
N	HONEYWELL INC	43- 71	71	0	0.0
N	IBM	236-293	288 3/4	-4 1/4	-1.4
O	MANAGEMENT ASSIST	9- 23	23 1/4	+3 1/2	+17.7
O	MICRODATA CORP	10- 19	19 3/8	+1 3/8	+7.6
O	MINI-COMPUTER SYST	5- 8	6 1/4	+1	+19.0
O	MODULAR COMPUTER SYS	7- 15	14 3/4	+ 1/2	+3.5
N	NCR	37- 84	64 1/8	+2 1/2	+4.0
N	PRIME COMPUTER INC	20- 39	30 3/8	- 1/2	-1.6
N	PERKIN-ELMER	17- 28	28	+1 1/4	+4.6
N	RAYTHEON CO	29- 48	38 1/4	+3	+9.3
N	SPERRY RAND	33- 48	47 3/8	- 3/8	-1.3
A	SYSTEMS ENG. LABS	11- 21	18 1/4	+ 1/4	+1.3
A	WANG LABS.	12- 26	25 7/8	+2 3/4	+11.8

LEASING COMPANIES

EXCH		1978 RANGE (1)	CLOSE AUG 9 1978	WEEK NET CHNGE	WEEK PCT CHNGE
O	ALANTHUS CORP	3- 6	3 7/8	- 1/8	-2.0
O	BOOTHE COURIER CORP	13- 18	18 1/2	- 1/8	-0.7
O	COMDISCO INC	5- 13	14	-2 1/2	+20.0
A	COMMERCE GROUP CORP	1- 1	3/8	0	0.0
A	COMPUTER INVSTRS GRP	1- 1	1	- 1/8	-11.1
P	DATRONIC RENTAL	1- 2	1 3/8	- 1/8	-8.3
A	DCL INC	3- 4	4	0	0.0
N	DPF INC	8- 14	13 7/8	+ 3/8	+2.7
N	ITEL	18- 32	32 1/4	+2 1/2	+8.4
N	LEASCO CORP	24- 38	36	+3 3/4	+11.6
O	LEASPAC CORP	1- 4	2 7/8	0	0.0
A	PIONEER TEX CORP	5- 7	6 6/8	- 1/8	-2.1
N	U.S. LEASING	13- 20	19 3/4	+1 3/8	+7.4

EXCH: N=NEW YORK; A=AMERICAN; P=PHIL-BALT-WASH
L=NATIONAL; M=MIDWEST; O=OVER-THE-COUNTER
O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
(1) TO NEAREST DOLLAR

SOFTWARE & EDP SERVICES

EXCH		1978 RANGE (1)	CLOSE AUG 9 1978	WEEK NET CHNGE	WEEK PCT CHNGE
O	ADVANCED COMP TECH	1- 2	1 1/8	0	0.0
O	ANACOMP INC	8- 22	21	+5 1/2	+7.8
A	APPLIED DATA RES.	8- 14	13 5/2	+ 3/4	+3.0
N	AUTOMATIC DATA PROC	24- 38	34 3/4	- 1/8	-0.3
O	COLEMAN AMERICAN COS	1- 2	5 3/4	0	0.0
O	COMPU-SERV NETWORK	7- 12	7 3/4	- 3/4	-8.8
O	COMPUTER HORIZONS	1- 5	8 1/4	+2	+32.0
O	COMPUTER NETWORK	8- 12	11 5/8	- 1/8	-1.0
N	COMPUTER SCIENCES	8- 10	10	0	0.0
O	COMPUTER TASK GROUP	1- 4	3	0	0.0
O	COMPUTER USAGE	2- 4	2 5/8	+ 3/8	+16.8
O	COMSHARE	6- 18	18	0	0.0
O	DATA DIMENSIONS INC	4- 7	8 1/8	+ 1/8	+2.0
O	DATATAB	1- 2	7/8	0	0.0
N	ELECTRONIC DATA SYS.	13- 23	22 1/8	+2 7/8	+14.9
O	INSYTE CORP	1- 2	2 3/8	+1	+81.3
O	IPS COMPUTER MARKET.	2- 3	3 1/4	+ 1/4	+8.3
O	KEANE ASSOCIATES	3- 6	5 1/2	0	0.0
O	KEYDATA CORP	1- 3	2 1/8	0	0.0
A	LOGICON	11- 16	18 1/4	+ 1/4	+1.5
A	MANAGEMENT DATA	1- 1	7/8	0	0.0
A	NATIONAL CSS INC	15- 33	32 3/4	+3 1/8	+10.5
O	NATIONAL DATA CORP	7- 12	11 1/8	0	0.0
A	ON LINE SYSTEMS INC	17- 28	26 1/4	+2	+8.2
A	PLANNING RESEARCH	4- 8	8	+ 3/8	+4.9
O	PROGRAMMING & SYS	1- 1	3/4	0	0.0
O	RAPIDATA INC	3- 6	5 5/8	- 1/8	-2.1
O	REYNOLDS & REYNOLD	18- 31	30 1/2	+3 1/2	+12.9
O	SCIENTIFIC COMPUTERS	3- 6	5 3/4	+ 1/4	+4.5
O	TYMSHARE INC	18- 30	28 1/4	- 3/4	-2.5
A	URS SYSTEMS	3- 7	6 1/2	- 5/8	-8.7
N	WYLY CORP	1- 9	4	- 1/8	-3.0

PERIPHERALS & SUBSYSTEMS

EXCH		1978 RANGE (1)	CLOSE AUG 9 1978	WEEK NET CHNGE	WEEK PCT CHNGE
N	ADDRESSOGRAPH-MULT	14- 29	29	+3 1/2	+13.7
O	ADVANCED MEMORY SYS	7- 17	18 1/2	+1	+8.4
N	AMPEX CORP	10- 17	16	- 1/4	-1.5
O	ANDERSON JACOBSON	3- 10	8 5/8	- 3/8	-4.1
N	APPLIED DIG DATA SYS	13- 18	55	- 1/4	-1.4
O	BEEHIVE INT'L	4- 7	5 3/4	- 1/4	-4.1
A	BOLT,BERANEK & NEW	4- 11	9 1/8	+ 1/4	+2.8
N	BUNKER-RAMO	10- 18	18	+ 3/8	+2.1
A	CALCOMP	3- 10	9 7/8	+ 1/4	+2.3
O	CAMBRIDGE MEMORIES	3- 8	7 1/2	+1 1/8	+17.6
N	CENTRONICS DATA COMP	16- 31	30 5/8	+5 1/8	+3.8
O	COGNITRONICS	1- 4	2 1/2	- 3/4	-23.0
O	COMPUTER COMMUN.	6- 10	9 1/8	0	0.0
O	COMPUTER CONSOLES	4- 10	9 1/2	+ 1/2	+4.3
A	COMPUTER EQUIPMENT	3- 4	4 3/8	- 1/8	-2.7
O	COMPUTER TRANSCEIVER	1- 2	1 3/4	+ 1/8	+7.6
O	CONTEN	9- 32	32	+4 1/2	+18.3
N	CONRAC CORP	59- 26	23 1/2	+2 5/8	+12.3
O	DATA ACCESS SYSTEMS	3- 5	8	+1 3/4	+41.1
O	DATA 100	9- 20	17 1/2	-2 3/8	-11.9
A	DATA PRODUCTS CORP	13- 24	23 1/4	+ 1/4	+1.0
O	DATUM INC	2- 3	4	- 3/8	-8.5
O	DECISION DATA COMPUT	2- 4	4 1/8	+ 1/8	+3.1
O	DELTA DATA SYSTEMS	1- 1	3/4	+ 1/4	+50.0
A	DOCUMATION INC	6- 27	26 1/8	- 3/4	-2.7
O	DATARAM CORP	8- 24	18	- 3/4	-4.0
N	ELECTRONIC M & M	4- 7	7 1/8	+ 1/4	+3.8
O	FABRI-TEK	1- 2	1 1/4	0	0.0
O	GENERAL COMPUTER SYS	1- 3	2	- 1/8	-5.8
N	HAZELTINE CORP	10- 16	13	+ 1/8	+0.8
N	HARRIS CORP	40- 86	68 3/8	+2 3/8	+3.7
O	INFOREX INC	6- 10	9 7/8	+1	+11.2
C	INFORMATION INTL INC	8- 11	10 1/4	- 1/4	-2.3
O	INTEL CORP	39- 82	57 1/2	+1 1/2	+2.8
A	LUNDY ELECTRONICS	4- 3	3	- 1/8	-2.4
O	MSI DATA CORP	12- 19	13 1/2	- 5/8	-3.8
N	MEMOREX	27- 33	52 3/4	+2 1/4	+4.4
N	MOHAWK DATA SCI	6- 14	13 1/2	-1 1/8	-7.8
O	PENRIL CORP	3- 12	10	0	0.0
N	PERTEC CORP	9- 14	11 7/8	- 1/8	-1.0
A	POTTER INSTRUMENT	2- 2	1 3/4	0	0.0
O	PRECISION INST.	2- 2	2	0	0.0
O	QUANTOR CORP	2- 5	2 1/2	- 1/4	-9.0
O	RECOGNITION EQUIP	7- 13	13 3/8	0	0.0
O	SCAN DATA	1- 5	4 1/8	- 1/2	-11.8
N	STORAGE TECHNOLOGY	19- 48	26 1/8	- 7/8	-3.2
O	T BAR INC	11- 19	16 1/2	0	0.0
O	TALLY CORP.	4- 9	7	0	0.0
A	TEC INC	6- 11	10 3/8	+ 1/8	+1.1
N	TEKTRONIX INC	33- 44	46 1/4	+1 1/2	+3.3
N	TELEX	3- 7	6 3/4	+1 1/8	+20.0
O	TESDATA SYSTEMS CP	13- 20	19 1/4	+1 1/4	+6.9
O	WILTEK INC	1- 1	1	0	0.0

SUPPLIES & ACCESSORIES

EXCH		1978 RANGE (1)	CLOSE AUG 9 1978	WEEK NET CHNGE	WEEK PCT CHNGE
A	AMERICAN BUS PRODS	6- 9	9 1/8	0	0.0
O	BALTIMORE BUS FORMS	2- 3	3 1/2	0	0.0
A	BARRY WRIGHT	14- 28	27 3/4	+ 1/2	+1.8
O	CYBERMATICS INC	1- 1	1 3/8	0	0.0
O	DUPLEX PRODUCTS INC	18- 28	27 1/2	+2 3/8	+9.4
N	ENNIS BUS. FORMS	8- 17	15 1/8	+ 1/8	+0.8
N	3M COMPANY	43- 62	62 1/4	+1	+1.8
O	MOORE CORP LTD	24- 34	32	+ 1/2	+1.5
N	NASHUA CORP	18- 31	29 3/4	-1	-3.2
O	STANDARD REGISTER	20- 28	23	- 1/2	-2.1
A	TAB PRODUCTS CO	8- 13	12 1/8	- 5/8	-4.9
N	UARCO	19- 27	24	- 1/4	-1.0
A	WABASH MAGNETICS	10- 17	14 1/2	+1 1/4	+8.1
N	WALLACE BUS FORMS	18- 29	28 1/8	- 5/8	-2.1

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